LIBRARY OF CONGRESS
JAN 29 1904
COPYRIGHT DIV.

THE IRON AGE

Library of Congress
Copyright Office
18 Jul 1904-d
Washington D.C.

A Review of the Hardware, Iron, Machinery [illegible] tal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 73: No. 4. *New York, Thursday, January 28, 1904.* $5 00 a Year, including Postage. Single Copies, 15 Cents.

Reading Matter Contents .....page 62
Alphabetical Index to Advertisers " 167
Classified List of Advertisers.... " 159
Advertising and Subscription Rates " 166

SHULTZ BELTING Co.
SHULTZ PATENT SABLE RAWHIDE BELTING.
SHULTZ
St. Louis, Mo.
New York. Boston. Phila.

IRON AND STEEL
REPUBLIC IRON & STEEL COMPANY
CHICAGO, ILL.
PRODUCTS

Bristol's Patent Steel Belt Lacing.
SAVES
Time, Belts, Money.
READY TO APPLY FINISHED JOINT
Greatest Strength with Least Metal.
Send for Circulars and Free Samples.
THE BRISTOL CO., Waterbury, Conn.

SAMSON SPOT CORD
Also Massachusetts and Phœnix Brands of Sash Cord.
SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES.
Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O.

MERRILL BROS., 405 Kent Ave., BROOKLYN, N.Y.

Mill Cinder.
PILLING & CRANE, Girard Building, Phila. Farmers' Bank, Pittsburg Empire Bldg., New York Board of Trade, Boston.

SEE ADVERTISEMENTS
PAGE 25

American Sheet & Tin Plate Company
Battery Park Building
New York

U.M.C.
NEW PRODUCTS.
.32 AUTOMATIC COLT METAL CASED
The .32 Automatic Colt Pistol Cartridge is loaded with a special high power smokeless powder, giving high velocity and operating freely through the mechanism of the Automatic Colt Pistol (pocket model). Those with the soft point bullet will be found desirable for sporting purposes, and those with metal case for military and target use.
RIM FIRE CARTRIDGES.
The U. M. C. .22 automatic rifle (Winchester model 1903) cartridge is now ready for the market. New .22 short ungreased, .22 long ungreased, and .22 Winchester inside lubricated are inexpensive rim fire cartridges loaded with the best grade of smokeless powder. Boys are calling for these cartridges as they can be carried loose in the pocket without the old inconvenience of the greased cartridge. They will not lead the gun.
U. M. C. Ammunition shoots well in any gun.
THE UNION METALLIC CARTRIDGE CO.
BRIDGEPORT, CONN.
Agency: 313-15 Broadway, New York City Depot: 86-88 First St., San Francisco, Cal.

CAHALL BOILERS See Page 116.

REGULAR PATTERN.
CAPEWELL HORSE NAILS
PLATE PATTERN. CORRUGATED PATTERN.
Branches:
NEW YORK, PHILADELPHIA, CHICAGO, ST. LOUIS, BOSTON, DETROIT, CINCINNATI, SAN FRANCISCO, PORTLAND, ORE., BUFFALO, BALTIMORE, NEW ORLEANS, DENVER.
THE CAPEWELL HORSE NAIL COMPANY
HARTFORD, CONN.
REGULAR PATTERN.

Jenkins '96 Packing
NONE BETTER, as it makes joint instantly and will last as long as the metals which hold it.
NONE CHEAPER, as it weighs less than many others sold at equal price per pound.
Remember, all genuine stamped with Trade-Mark.
JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for Drawing and Stamping
THE AMERICAN TUBE & STAMPING COMPANY
(Water and Rail Delivery) BRIDGEPORT, CONN.
SEE PAGE 27.

MAGNOLIA METAL.
Best Anti-Friction Metal for all Machinery Bearings.
Fac-Simile of Bar. Beware of Imitations.
MAGNOLIA METAL CO.,
Owners and Sole Manufacturers, Chicago, Fisher Bldg.
113-115 Bank Street, NEW YORK.
San Francisco, New Orleans, Montreal, Boston, Pittsburg and Philadelphia. We manufacture all grades of Babbitt Metals at competitive prices.

THE
ANSONIA BRASS AND COPPER CO.
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

SOLE MANUFACTURERS
Tobin Bronze
(TRADE-MARK REGISTERED.)
Condenser Plates, Pump Linings, Round, Square and Hexagon Bars, for Pump Piston Rods and Bolt Forgings.
Seamless Tubes for Boilers and Condensers.
99 John Street, - - New York.

Randolph=Clowes Co.
Main Office and Mill,
WATERBURY, CONN.
MANUFACTURERS OF
SHEET BRASS & COPPER.
BRAZED BRASS & COPPER TUBES.
SEAMLESS BRASS & COPPER TUBES
TO 36 IN. DIAM.
New York Office, 253 Broadway, Postal Telegraph Building, Room 715.
Chicago Office, 902 Fisher Bldg.

BRASS { SHEET ROD WIRE
COPPER { SHEET ROD WIRE
GERMAN SILVER { SHEET ROD WIRE
LOW BRASS. SHEET BRONZE. SEAMLESS BRASS AND COPPER TUBING. BRAZED BRASS AND BRONZE TUBING. : : : : : : : :

WATERBURY BRASS CO.,
WATERBURY, CONN.
130 Centre St., New York. Providence, R. I.

BRIDGEPORT DEOXIDIZED BRONZE AND METAL COMPANY,
BRIDGEPORT, CONN.
Largest Jobbing Brass Foundry in New England.
LARGE CASTINGS A SPECIALTY.
Bronze, Brass, Aluminum and Babbitt Metals.
No order too large for us to handle.
None too small to receive our careful attention.

THE PLUME & ATWOOD MFG. CO.,
MANUFACTURERS OF
Sheet and Roll Brass
—AND—
WIRE
PRINTERS' BRASS, JEWELERS' METAL, GERMAN SILVER AND GILDING METAL, COPPER RIVETS AND BURRS.
Pins, Brass Butt Hinges, Jack Chain, Kerosene Burners, Lamps, Lamp Trimmings, &c.
29 MURRAY ST., NEW YORK.
144 HIGH ST., BOSTON.
199 LAKE ST., CHICAGO.
ROLLING MILL: THOMASTON, CONN. | FACTORIES: WATERBURY, CONN.

SCOVILL MFG. CO.,
Manufacturers of
BRASS, GERMAN SILVER
Sheets, Rolls, Wire
Rods, Bolts and Tubes,
Brass Shells, Cups, Hinges,
Buttons, Lamp Goods.
SPECIAL BRASS GOODS TO ORDER
Factories, WATERBURY, CONN.
DEPOTS:
NEW YORK, CHICAGO, BOSTON.

JOHN DAVOL & SONS,
AGENTS FOR
Brooklyn Brass & Copper Co.
DEALERS IN
COPPER, TIN, SPELTER, LEAD, ANTIMONY.
100 John Street, - New York.

Matthiessen & Hegeler Zinc Co.,
LA SALLE, ILLINOIS.
SMELTERS OF SPELTER
AND MANUFACTURERS OF
SHEET ZINC AND SULPHURIC ACID.
Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.
ZINCS FOR LECLANCHE BATTERY.

Arthur T. Rutter
SUCCESSOR TO
WILLIAM S. FEARING
256 Broadway, NEW YORK.
Small tubing in Brass, Copper, Steel, Aluminum, German Silver, &c. Sheet Brass, Copper and German Silver. Copper, Brass and German Silver Wire. Brazed and Seamless Brass and Copper Tube. Copper and Brass Rod.

BRASS FOUNDERS FINISHERS J. J. RYAN & CO.
88-74 West Monroe St., Chicago.
Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS On Short Notice.

Brass, Bronze and Aluminum CASTINGS
FOUNDERS—FINISHERS.
W. G. ROWELL & CO., Bridgeport, Conn.

HENDRICKS BROTHERS
PROPRIETORS OF THE
Belleville Copper Rolling Mills,
MANUFACTURERS OF
Braziers' Bolt and Sheathing
COPPER,
COPPER WIRE AND RIVETS.
Importers and Dealers in
Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

"Search-Light"
OIL and GAS
Bicycle Lanterns.
Send for Circulars and Electrotypes.
THE BRIDGEPORT BRASS CO.,
Bridgeport, Conn.
19 Murray St., N. Y. 17 No 7th St., Philadelphia. 85 to 87 Pearl St., Boston.

Hot Water Supply. A practical treatise upon fitting of hot water apparatus for domestic and general purposes. By F. Dye. Fifth edition, entirely rewritten. 80 pages. Cloth $1.00
For sale by David Williams Co., 232 William St., N.Y.

THE IRON AGE

THURSDAY, JANUARY 28, 1904.

The Norton New 14-Foot Grinding Machine.

Even aside from various other points involved in its construction and manipulation, the new Norton grinding machine is of considerable interest, combining as it does with the capacity for swinging upon its centers pieces of work weighing as much as 7000 pounds and having dimensions as large as 18 inches diameter by 14 feet long, the ability to advance the grinder wheel by positive indexing methods, such that work may be reduced in diameter by one-quarter of one one-thousandth of an inch at a time or may be so deeply cut as to remove 1 cubic inch of metal per minute. From the front view of the machine, as presented in Fig. 2, a general idea of its appearance may be had. In Fig. 1 is a detail, showing to an enlarged scale the controlling mechanism near the middle of the length of the machine as shown in Fig. 2. The base of the machine is a single casting, 22 feet long and weighing 10,500 pounds. The complete machine weighs about 22,000 pounds. The rear view of the machine would present practically the same appearance as do the standard machines made by the same company.

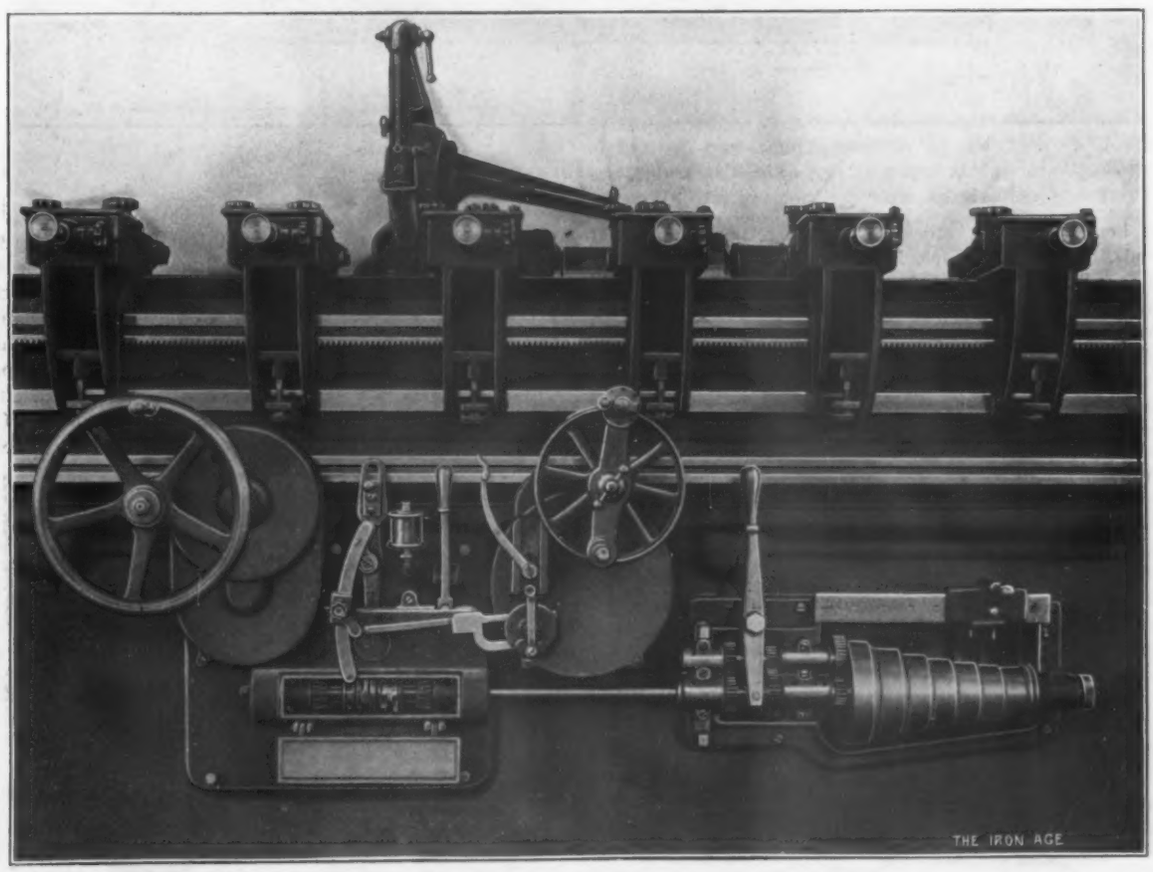


Fig. 1.—View at Midlength, Showing Details of Operating Mechanism.

THE NORTON NEW 14-FOOT GRINDING MACHINE.

Rotation of the work carried upon the head and foot stock centers is effected by belt drive to the cone pulley in the head stock. Variation of rotative speed is secured by shipping the belt from step to step on the cone by means of a sliding shipper traversing an inclined guide, seen in Fig. 2 above the head stock. The cone has eight steps, which, with the two speeds provided by the overhead drive, gives 16 available speeds of rotation for the work. To facilitate the movement of the belt, the cone and spindle are arranged to swing upon a common center, so that by depressing the lever handle seen at the extreme left of the head stock the cone may be raised. When in place this swinging frame is locked by a small ball lever at the left of the head stock near the large lever already referred to. The spindles for the head stock and foot stock are very massive, the center holes having diameters of 3 inches at their mouths. To accommodate the different lengths of work, either head or foot stock may be moved along the table ways by means of a hand crank connecting with rack pinion in the usual manner.

The sliding ways for the table are well lubricated by oil rollers or wheels in the pockets, whose exteriors may be seen at the front of the base in Fig. 2. These several pockets are connected into one system by a large groove, so that the oil will remain at a common level in all. The drip pockets at the extreme ends of the ways are at the same hight as the others, so that when these end pockets show a proper depth of oil it may be known that all of the pockets are equally well supplied. Thus there is no necessity for removing the table to uncover the pockets to see that the oil supply is maintained.

The grinder wheel spindle and its bearings are the same as regularly used on the company's 18 x 96 inch machines. They are massive and well constructed and are mounted upon a slide, the weight of which with the spindle pulley and other attached parts is about 1400 pounds. This slide rests upon one V-way and one flat way of ample proportions, so as to carry the wheel steadily, yet without the possibility for intermittent motion such as might possibly occur were gibbed ways used. These ways are oiled by methods designed to avoid the possibility of stickiness. Furthermore, the extraordinary

width of the ways is believed to thoroughly float the mass upon an unbroken film of oil, making possible the freedom of movement necessary for indexing the wheel to give reductions of diameter of the work so small as 0.00025 inch, as already stated.

The swivel table for grinding tapers is on the same general principle as in other machines, and is provided with a simple method for moving it. The swivel table with its mate, the sliding table, weighs about 5500 pounds.

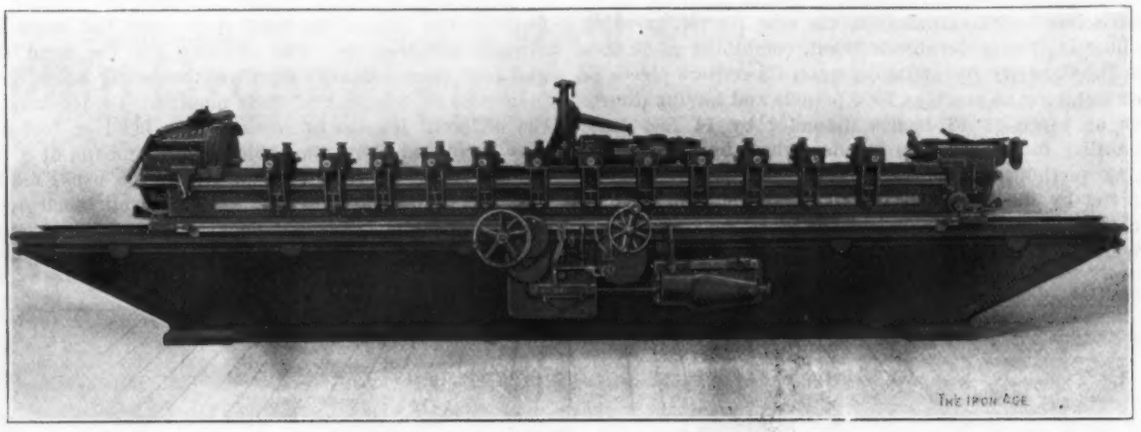


Fig. 2.—Front View of the Complete Machine.

The head and foot stocks weigh together about 400 pounds. Thus the tables, in combination with the head and foot stocks and including the numerous steady rests furnished and used as shown in Figs. 1 and 2, aggregate a weight considerably exceeding 6000 pounds, and form a moving anvil which is said to be quite sufficient to prevent the vibration when the wheel is worked up to the capacity of the machine. This capacity, as already indicated, is stated as being such that from steel bars of nearly all diameters metal may be removed at the rate of 1 cubic inch per minute.

From a study of Figs. 1, 3 and 4 the mechanism for controlling the table traverse, both in direction and speed, and for indexing the grinding wheel upon its cross slide support, may be understood. In Fig. 1 the cover is removed from the table traverse speed gearing, and the oil cover is dropped so as to expose the double throw clutch controlling the direction of table traverse motion. The belt delivering power to the seven-step cone is moved from step to step by the handle and slide above the cone. This shifter handle is not incased when the usual cover is in place, as in Fig. 2. As is evident from Fig. 1, the face of the way upon which the shifter slides has drilled in it at intervals holes into which enters an index pin attached to the shifter handle, thus providing means for locating the shifter properly for the several steps.

To the left of the cone and controlled by the vertical lever there plainly shown is the back gearing arrangement, by which the seven available cone speeds are doubled to give 14 possible speeds for the shaft leading to the left of the reversing gearing. Fig. 4 is a rear view of the table moving mechanism, which is attached to the plate carrying the reversing gearing at the left of Fig. 1. Thus Fig. 4 is the reverse view from that presented in Fig. 1. Extending to the left from behind the plate in Fig. 4 is shown the shaft, which in Fig. 1 extends to the right from the reverse gearing to the speed changing drive. As shown in Fig. 4, the end of this shaft carries the sliding member of a duplex jaw clutch. Into the groove between the toothed faces fits the yoke of

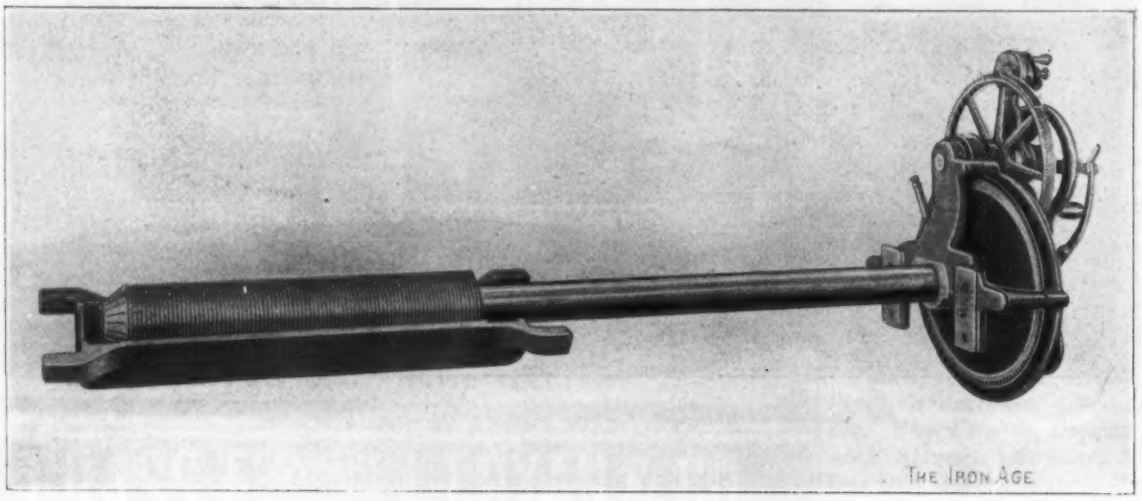


Fig. 3.—Cross Feed Screw, with Indexing Mechanism.

THE NORTON NEW 14-FOOT GRINDING MACHINE.

the vertical lever controlling the back gearing, as already noted. With the lever in central vertical position, the table traverse mechanism of Fig. 4 is entirely disconnected. Movement of the lever either to right or to left engages either the fast or slow table traverse, respectively, giving correspondingly fast and slow speed, according to the particular step of the cone upon which the belt runs. The cone shaft is continuous through the first bearing adjacent to the largest step. Keyed to the cone shaft between the bearing and the largest step is a pinion continuously meshing with the gear upon the upper shaft. This upper shaft carries between its bearings two pinions which continuously mesh with the lower gears. These gears, which run loose, have their hubs

formed with clutch teeth to fit those on the sliding piece controlled by the vertical lever. Moving the lever handle to the right throws in the fast speed by engaging the left hand lower gear; similarly, the slow speed is thrown in by the engagement of the right hand lower gear.

The movement of the table is started and stopped by means of the vertical lever at the upper left hand corner of Fig. 4, adjacent to the oil cup. In Fig. 1 this lever is also plainly shown adjacent to the oil cup at the upper right hand corner of the drive plate. To the left hand of the oil cup is seen in Fig. 1 the reversing lever which actuates the dental clutch controlling the reversing gearing below, as already noted. The upper end of the reverse lever is arranged close to a T-slot in the front edge of the table so as to be struck by adjustable dogs set to stop and reverse the table at any point. The arrangement is evidently such that a very quick stop and reverse may be effected. At the upper left hand of the drive mechanism group in Fig. 1 is a hand wheel suitably geared to the drive mechanism, as in Fig. 4, so that the table traverse may be operated by hand when desirable.

Between the driving mechanism and the speed changing device is located a third group of mechanism, which

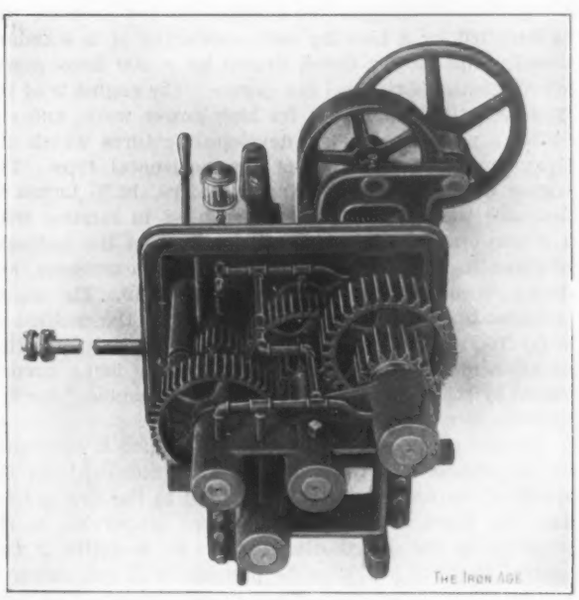


Fig. 4.—Rear View of Traverse Gearing.

THE NORTON NEW 14-FOOT GRINDING MACHINE.

controls the cross feed for the grinding wheel either by power or by hand. In Fig. 3 is shown a detail of the cross feed mechanism, viewed from the side and rear. At the extreme right of Fig. 3 is the mechanism at the front of the machine as shown in Fig. 1. The mechanism shown in Fig. 3 differs slightly from that of Fig. 1 in having in the former case a hand wheel where a double ball handle is used in the machine of Fig. 1. The operation in both cases, however, is the same. The large index wheel is of cast steel and is cut with standard gear teeth, into which meshes a pinion of eight teeth attached to a short shaft passing through an eight-hole index dial, and there fitted with an index handle. The dial forms one end of a double lever pivoted upon the stud carrying the index wheel. The opposite end of the lever is fitted with a crank handle. By tightening the double ball handle at the middle of the lever (the small hand wheel in Fig. 3, as already indicated) this lever may be clamped rigidly to the stud upon which it is supported. Thus fixed rigidly, the dial at the upper end of the lever serves as a means to index the rotation of the large gear. The gearing between the index wheel and the cross feed screw is such that one complete rotation of the index handle controlling the pinion meshing with the index wheel corresponds to a cross feed movement of 0.001 inch. Movement of the index handle one hole on the index plate gives one-eighth of one one-thousandth of an inch movement of the wheel, corresponding, therefore, to a reduction of diameter of one-quarter of one one-thousandth. A reduction of 0.001 inch in diameter is, therefore accomplished by one-half turn of the index lever. Releasing the lever on the stud by loosening the ball handle (or hand wheel) enables the operator to rapidly move the grinding wheel forward or back by free rotation of the index gear, using the crank handle of the cross lever just as though it were attached directly to the index wheel. In this case, then, the index wheel is driven through the small index pinion, the index pin, of course, being properly inserted into one of the eight holes in the dial.

Swung off to the left of the index wheel in Fig. 1 is a long pawl, which, when thrown into contact, works as a ratchet against the teeth of the wheel. By means of a segment attached in front of the drive plate and just above the reversing gearing, the rate of cross feed of the wheel by means of this pawl may be adjusted. It is seen, then, that the index wheel may be positively and accurately rotated through the arc represented by one tooth and corresponding to one hole of the dial, or may be rapidly turned by hand for quick cross feed of the wheel, or may be rotated intermittently by power.

That the mechanism between the index wheel and grinding wheel may be started from rest, moved one-eighth of one one-thousandth of an inch, and there brought positively to rest, is a feat the accomplishment of which in the present machine constitutes probably its most essential and interesting feature. How this is done may best be understood by reference to Fig. 3. The index wheel here seen at the top of the cross feed mechanism carries at its near end a small pinion, meshing directly with the large gear fixed to the outer end of the cross feed screw shank. The cross feed screw itself is massive throughout, including the shank. The threaded portion is 3½ inches in diameter and about 18 inches long. The threads are of the Acme form, the points ground to give an accurate outer diameter, such as will afford a good bearing in the bracket shown in the illustration. This bracket bearing is bored and scraped to fit the screw. The summation of the thread tops gives a bearing surface equivalent to that of a cylindrical section 4 inches long and of the full diameter of the screw, 3½ inches. This continuous bearing, however, is here distributed over the full length of 18 inches and affords a rigid support to the screw throughout its length. The bracket bearing, shown underneath the screw in Fig. 3, is fastened securely to the under side of the cross slide base. At each end of the bearing is an oil chamber, the two pockets being connected by an oil channel beneath the bearing, so as to allow a free passage of lubricant from one end to the other. The screw proper being larger than the stem, the bearing forms a bath such that the screw is continuously dipped in oil.

The upper half of the screw is embraced by a half nut about 10 inches in length secured to the wheel slide. This nut is accurately made, having its threads finally scraped for perfect bearing upon the screw. Thrust of the screw in holding the wheel forward against the work is taken to a bronze plug imbedded in a very massive casting. Against this plug bears the beveled end of the screw. The beveled portion is cut with radial grooves, whose action in lubricating the thrust bearing is obvious. The rigidity of the thrust bearing, the massive character of the screw and its connections, together with the rigid supporting of all parts, make possible the indexing of the cross feed so closely, as already described. It is the consistent and careful adaptation of the anvil principle upon which the designers of this machine place their dependence for its positive and accurate action in effecting such minute reduction in diameter of work. The screw, if moved at all, must revolve. It is so supported that it cannot swing to right nor to left, nor downward way from the nut. Rigidity in the screw itself and in the method of its support insures that the screw must turn, however slightly, when the index wheel is moved, and that the grinding wheel must be advanced positively the corresponding distance.

It is stated to be perfectly practical with this machine

to remove any desired amount of material from steel by intervals of diameter from one-quarter of one one-thousandth up to five or ten one-thousandths, according to the area of surface of the work, while obtaining accurate measurements, either automatically by means of the power cross feed or by hand by means of the index. It is stated that with this machine an interesting demonstration of unusual accuracy may be made by having the operator set a micrometer caliper to the diameter of the work over which the grinding wheel has just passed, then set the micrometer from 0.00025 to 0.005 inch smaller, and, after indexing the machine a corresponding amount and traversing the wheel over the work, to show that the reset micrometer exactly fits the work after the second cut.

As has already been indicated, the mechanism for operating the table and grinding wheel is in three groups, attached practically independently to the front of the machine. This method of construction affords convenient access to the mechanism at any time either for examination or repairs, either group being readily removable bodily and with practically no disconnecting of parts. The construction also facilitates the manipulation of the various adjustments. It will be seen that by this grouping of mechanism the operator may adjust the position of his wheel for measuring the work, may change the speed of the table, start and stop the table, reverse the table by hand, move the table by hand wheel, and adjust the steady rest, all without moving from the position at midlength of the machine, regardless of how long is the work swung upon the centers.

The machine is furnished with wheel guards suitable for mounting wheels of 1-inch and 2-inch face; also for wheels of 4-inch face when required, as, for instance, when much heavy work with long surfaces must be handled. The wheel slide is said to be perfectly steady when working a wheel of 4-inch face up to the maximum power in the main drive of the machine.

Water grinding compound is supplied to the work at the rate of 35 gallons per minute. The spout is so arranged by means of a novel guiding front that the water may be directed upon the work in several different ways to suit various conditions. This guiding front of the spout prevents spattering of the water forward toward the operator and enables him to thoroughly cover the wheel with a thick layer of water when using the diamond.

Overhead works and pulleys supplied with the machine are arranged to transmit 15 horse-power. Usually the work on such a machine requires from 5 to 10 horse-power, according to the amount of material to be removed. In some cases, where an extraordinary amount of work has been required in the removal of a large weight of metal per minute, it has been found that 15 horse-power have been required for short periods. Motor driving equipment for this machine may be furnished when required. The builders of the machine are the Norton Emery Wheel Company, Worcester, Mass.

High Pressure Gas Distribution.

A gas power installation of exceptional interest is now under construction by the Laclede Gas Light Company of St. Louis, Mo. The system has for its object more efficient distribution of gas over larger areas than may be economically covered by the simple method of running large low pressure mains from a centrally located gas generating plant to supply all parts of the city. The system under construction is intended to supply the entire city of St. Louis, embracing an area of approximately 65 square miles.

It is evident that in order to serve the outlying districts of such an area, one of three methods must be employed: 1, A large low pressure feeder from the central holder to the center of the district to be covered; 2, medium sized feeders from the main holder to auxiliary holder in the center of the district; and, 3, a high pressure feeder to the distributing center, using pressure reducing valves at this point for obtaining proper pressure upon the service lines. The enormous expense for construction entailed by the first two methods has practically prohibited their use in St. Louis, and the high pressure system is being installed. With this system, the size of feeder pipes is greatly reduced, and the necessity of auxiliary district holders is entirely done away with.

For serving suburban communities, lying far beyond the city limits, this method may be extended and the pressure of the gas raised to any desirable extent for transmission through small pipes, this pressure being reduced at the suburban distributing center by pressure regulators, as in the medium pressure system above mentioned.

The pressures to be employed in the system under construction at St. Louis are approximately 5 pounds per square inch for the medium pressure feeders, and from 20 to 80 pounds per square inch for the high pressure suburban feeders. On account of the use of cast iron mains the 5-pound limit was chosen for the medium pressure system, but for the high pressure system iron pipe with screwed fittings will be used. With this construction any desirable pressure may be carried with entire safety and the radius of distribution extended to 100 miles if necessary.

In the medium pressure system, the gas pressure will be supplied by a blowing unit, consisting of a standard Connersville blower direct driven by a 300 horse-power Westinghouse horizontal gas engine. The engine is of the type recently brought out for high power work, and embodies a number of newly developed features which distinguish the construction of the horizontal type. The engine has two double-acting cylinders, 16.50 inches in diameter and 24-inch stroke, arranged in tandem with a single crank. The engine uses for fuel the ordinary illuminating gas such as is distributed to customers, and draws its supply directly from the gas main. The engine operates upon the four-stroke cycle, and the method of governing secures a constant quality of explosive mixture at all loads, the quantity of the mixture being proportioned by the governor to the load on the engine. Electric ignition is employed.

In this particular installation the engine is controlled by an automatic pressure governor which adjusts the speed of the unit in direct proportion to the demand for gas, the speed thus being in inverse proportion to the pressure in the distribution main. So sensitive is this control that the variation in pressure will not exceed 8 ounces for a 50 per cent. range in gas output. The regular centrifugal speed governor is, however, also used in order to prevent, under any conditions, the engine running at excessive speed.

The St. Louis installation is one of the first of its kind in the illuminating gas field and presents many interesting features which will be subsequently brought out in special articles at the completion of the work. The system has, however, long been in successful use in the distribution of natural gas over large districts adjacent to natural gas fields. The St. Louis system is in charge of W. A. Baehr, engineer of the Laclede Gas Light Company.

The Birmingham Statue of Vulcan for St. Louis.—A colossal clay statue of Vulcan was finished at Passaic, N. J., on January 22. It will be shipped to Birmingham, Ala., to be cast in iron for the Alabama State exhibit at the St. Louis Exposition. It is the work of Giuseppe Moretti, who, after completing a clay model in his New York studio, hit upon an uncompleted church in Passaic while in search of a place high enough to contain the colossal statue. The giant clay figure which was erected by the sculptor has been covered with a heavy coating of plaster of Paris. It will be cut in sections for shipment to Birmingham. The fund for the statue was raised by the citizens of Birmingham, and at the close of the exposition the figure will be returned to that city and set up in Capitol Park. At St. Louis it will be the center of the State exhibit of iron and steel products. It is the second largest statue in the world, the largest, it is said, being the Statue of Liberty.

A Substitute for Looped Hose on Traveling Air Hoists.

Possibly the most troublesome feature, and certainly the greatest nuisance in connection with the use of traveling cranes and hoists in which compressed air is used as the actuating medium, is the difficulty commonly attendant upon the delivery of the fluid to the moving mechanism. One of the most simple yet really cumbersome methods is that wherein a flexible hose is used; its length somewhat exceeding one-half the total longitudinal travel of the hoist; connected to a fixed source of air supply located about midway of the runway; and supported at intervals of its length by suitable trolley connections such as to allow the hoist entire freedom of travel, the hose hanging in loops between its points of support. Various means to avoid the use of this rather crude method have been tried, and numerous devices have been contrived for use in this connection. Probably the latest of the appliances devised for this purpose is illustrated in the engravings herewith.

In this case the air supply line for the crane or hoist is arranged in the form of a continuous pipe of suitable size running full length of the runway and supported freely at suitable intervals upon swinging brackets. The pipe is in short sections, connected by internal couplings, so that the outer surface of the pipe is smooth and practically continuous. Each of these internal couplings serves not only to join the adjacent short sections of the supply pipe, but is arranged to contain within itself a valve from which air may pass to the crane mechanism under the proper conditions, as will be described.

Referring to Fig. 2, A is the air pipe running the full length of the runway and supported freely, as shown, by the counterweighted hanger B, carried upon a stud extending outward from any suitable support, C, to which it is attached in a convenient and substantial manner. The hanger B is arranged to turn freely upon the stud, and is normally held in an upright position by the counterweighted lower end *b*. The upper end of the hanger is in the form of a saddle or yoke, each fork of which carries a small roller, *d*. In Fig. 3 is shown the method of connecting two sections of the pipe A by means of the internal coupling D, in which is placed the valve *e*. The seat *f* in the valve *e* is screwed into place from the exterior of the pipe and, when removed, frees the valve also for removal upward through the hole. Extending upward from the face of the valve and protruding above the exterior of the pipe is the cage *h*, by means of which the valve is depressed to allow the air to pass outward. Under the stem of the valve is a helical spring, *i*, for holding the valve in place when the air pressure is off, and for returning it quickly to its seat when the crane moves away to other portions of the supply pipe.

From Fig. 1 the operations of the whole device may be understood. Here E is a long shell or sleeve with conical ends, within which ends stuffing boxes are arranged to make tight joints between the sleeve ends and the exterior of the pipe A, which the sleeve embraces and along which it moves. This sleeve is attached to the traveling crane or hoist, and moves with it at all times. From the outlet *j* pipe connections are led to the hoisting and traversing mechanism. At B is shown the swinging hanger of Fig. 2, the conical end of the traveling sleeve having struck the small rollers *d* and deflected the hanger to one side. It will be understood that as the sleeve passes beyond and away from the successive hangers the latter return to their normal vertical positions to support the pipe A. The length of the sleeve is enough greater than that of each section of the pipe A to enable it to include at all times within its interior at least one of the valves *e*, Fig. 3. As the sleeve traverses the length of the pipe A the stuffing box at the advancing end of the sleeve successively depresses the valves *e* by striking the protruding cages *h* and forcing the valves downward against the air pressure and the springs *i*. As seen from the cross section at the right of Fig. 1, the interior of the shell E between the stuffing boxes at the extreme ends carries a longitudinal rib, *k*, which holds the valve open during the time that the sleeve is above and covering it. Thus for any position of the crane throughout the length of the runway open connection is maintained between the interior of the air supply pipe and the hoisting and traveling mechanism through the valve *e* and the connection *j*.

The device is the invention of James L. Pilling of the Pilling Air Engine Works, Bucyrus, Ohio.

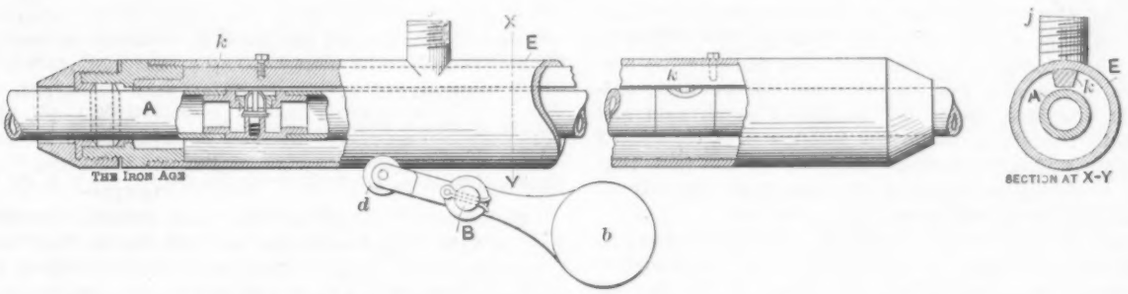


Fig. 1.—Receiver Sleeve as Fitted to Pipe, Showing Its Method of Releasing the Air.

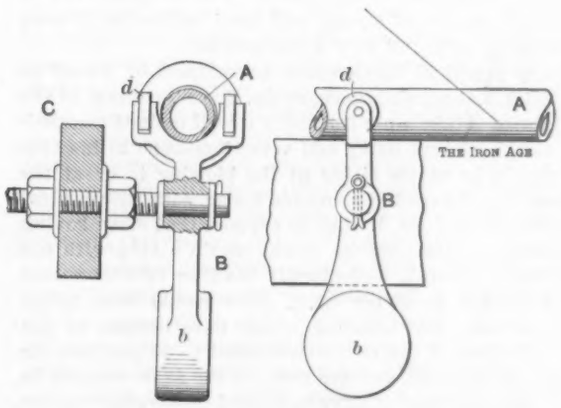


Fig. 2.—Swinging Bracket and Support.

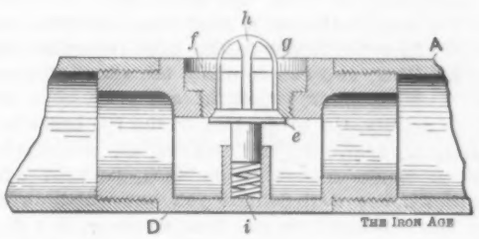


Fig. 3.—Combination Pipe Coupling and Air Valve.

The Platz Method of Calculating Furnace Burdens.

BY J. B. NAU.

The Platz method of calculating blast furnace burdens is now generally followed by German blast furnace managers. Before B. Platz published the results of his observations in *Stahl und Eisen*, January, 1892, it was customary to base the calculation of blast furnace burdens on the ratio of the oxygen of the acid or silica to the oxygen of the bases, and it was admitted that alumina, an R_2O_3 base, could take the place of an equivalent weight of lime or an RO base, and *vice versa*.

But when making these substitutions, it was noticed many times that the resulting slag did not always retain the desired qualities in regard to fluidity and fusibility, and this deficiency was attributed to the disturbing influence that resulted through the very substitution of alumina for lime or lime for alumina. Well aware of this, and in order to eliminate the difficulty, many blast furnacemen considerd also the relative proportion of alumina, and decided that, for instance, one-half or one-third should be considered as an acid and added to the silica, while the balance was considered as a base. This proceeding was based on the fact that in its combinations alumina at time plays the *rôle* of an acid, and at other times it acts as a base.

With this manner of calculation some good practical results were obtained; in fact, mostly better results than were usual when basing the calculation of the slag on a well defined ratio of oxygen of silica to oxygen of base, where alumina was considered solely as a base.

Still Platz is of the opinion that it is an error to assume that in one and the same slag one part of the alumina can act as an acid while the other part acts as a base, and that such a difference in the chemical constitution would be indicated or characterized by special physical qualities.

Wedding in the second supplement to his hand book on the metallurgy of iron lays down some rules in regard to the constitution of a good blast furnace cinder, and states: In order to obtain the most favorable conditions of smelting, and consequently the smallest amount of fuel, it is necessary, that in any slag of a given basicity or acidity, the proportion of the RO bases to the R_2O_3 bases, or, neglecting the alkalies, the proportion of the sum of MnO, CaO, MgO to Al_2O_3 be kept within certain limits, not well defined yet, but which in good practice lies between two and four atoms of RO to one atom of R_2O_3. According to Wedding this condition of the slag can easily be obtained with a judicious mixing of the different ores of the burden.

But from the author's standpoint, while a judicious mixing of ores and fluxes will enable one to obtain a slag within the limits above quoted, still the burden obtained when mixing the ores with a certain well defined view of ratio of oxygen of acid to oxygen of bases, on one hand, and the endeavor, on the other hand, to keep the right proportions between the RO bases and Al_2O_3, may become too expensive for an economical run.

With this view, Platz decided to study more closely the physical appearance of the blast furnace cinder, and to compare their physical characteristics with their chemical composition, so as to find out what influence a varying amount of alumina has on the quality of the cinder.

His observations extended over several years, and covered a great many blast furnace slags, varying in composition from 25 to 40 per cent. of silica, from 7 to 17 per cent. of alumina, and from 38 to 58 per cent. of lime. They led him to the conclusion that alumina should not be considered as a base in the slag, but rather as an acid, and he expresses his opinion in regard to the matter by the establishment of the two following rules:

1. The physical constitution of the slag in regard to its structure and appearance when cold, and its behavior in the fluid state, popularly characterized by the expressions "short," "long," "basic," "acid," &c., does not solely depend upon the ratio of oxygen of the silica to oxygen of the bases, but is more correctly determined by the ratio of the sum of the RO bases to the sum of silica and alumina. In other words: In blast furnace slags silica and alumina can be mutually substituted, but not alumina and lime.

2. The composition of a pig iron in regard to silicon, manganese and sulphur (burden and temperature of the reduction zone remaining the same) will always depend upon a given percentage of lime in the slag, and not upon a given ratio of oxygen of silica to oxygen of bases, so that in this direction again lime cannot be replaced by alumina, but this latter can be replaced by silica, and *vice versa*.

As demonstrating No. 1, Platz submits two foundry iron slags of different composition, but in which the proportion of oxygen of silica to oxygen of bases is the same.

	No. 1. Per cent.	No. 2. Per cent.
SiO_2	37.1	35.4
Al_2O_3	16.7	9.2
CaO	38.5	47.2
MgO	1.90	2.3
MnO	0.7	0.4
FeO	0.4	0.4
CaS	4.1	4.6
Totals	99.4	99.5

Oxygen of silica to oxygen of bases in No. 1 $= \frac{19.7866}{19.7884} = 1$ per ct.

Oxygen of silica to oxygen of bases in No. 2 $= \frac{18.8800}{18.8710} = 1$ per ct.

Both slags, although obtained with different burdens, happen to be singulo-silicates, but nevertheless they were characterized by great differences in their physical appearance. No. 1 was long, vitrous; No. 2 earthy looking inside, rough and granular on the surface. The first, when liquid, was viscous, and would draw long threads; No. 2 was very fluid and broke short. Furthermore, No. 1, when cold, remained strong and hard, while No. 2 even before being cold fell into a fine powder.

Every practical furnaceman accustomed or forced to work with a short slag, such as No. 2, for instance, in the endeavor to obtain a pig iron with a well defined composition, would without delay add some limestone to his burden, should he notice either at the blowing in or at the moment of a change in the burden a slag with the physical characteristics of No. 1. Let us suppose that after having increased his limestone he would obtain a slag with the appearance of No. 2, undoubtedly his lime content would have increased to 47 per cent., silica would have fallen to 31 per cent., and alumina would have become 14 per cent. The sum of the two latter, equal to 45 per cent., is very nearly the sum, 44.6 per cent., of the same element in No. 2. But the ratio of oxygen of acid to oxygen of bases becomes $\frac{16.5333}{20.9761} = 0.79$, instead of 1.0, as above.

Illustrating rule No. 2.—The pig iron obtained with slag No. 1 contained more silicon and sulphur, but less manganese, than the iron obtained with slag No. 2. The temperature of the blast and the proportion of coke to ore burden were the same in both cases; the difference in the burden in regard to iron and manganese content was insignificant. It is a well-known fact that with ores high in alumina, iron high in silicon can be obtained, while in the manufacture of spiegeleisen the slag should contain little alumina. The influence of alumina in tending to produce high silicon iron as well as iron low in manganese may be counteracted effectively by not relying on the basicity given by a high alumina content, but rather by making the slag sufficiently calcareous.

Of two slags containing the same amount of silica, but different amounts of alumina, the one with the greatest amount of alumina is, chemically speaking, the more basic, because alumina contains 1.5 times more oxygen than lime. Therefore, with the same amount of silica in a slag, the oxygen of the bases becomes greater the more alumina takes the place of lime; hence, in that case, the ratio of oxygen in the silica to oxygen in the base decreases. But the great basicity of the slag thus obtained, as is illustrated in the example above quoted, is not shown by its physical appearance, which should be "short;" on the contrary, with the same amount of silica content, the slag richer in alumina is always longer and

draws longer threads than the one with less alumina. From this it results that lime is the element that mainly constitutes the so-called "shortness" of the slag.

The variations in the lime content, or rather in the RO bases, may be observed with the naked eye, provided that three-quarters of them are lime. With a little practice their amount can be estimated to within 1 per cent. But it is impossible to estimate separately in the same way either the silica or the alumina contents. The sum of both, however, may approximately be found by deducting the sum of the above estimated RO bases from 100 minus calcium sulphide and alkalies, or from $100 - (5 + 1) = 94$.

Here Platz states that in a comparison of two slags care must be taken that they be allowed to cool under similar conditions.

Concerning slags that have fallen to dust or powder, the fineness of the powder is sufficient to give to the practiced eye a good indication in regard to lime basicity. Of two slags that he quotes to that effect No. 1 had an acidity of 0.76 as the ratio of oxygen in the silicia to the oxygen in the bases, while the acidity of No. 2 was 0.64. In spite of this difference, the more acid No. 1 slag formed a finer powder than the No. 2 slag, because in No. 1 slag the percentage of lime was 50.50 per cent. against 48.50 per cent. in No. 2. But, when making substitutions, Platz goes on to state that while, theoretically or chemically speaking, a certain amount of silica should naturally be substituted for a chemically equivalent amount of alumina, and that the same should be done with the RO bases among themselves, in practice, however, this need not be followed so very closely, for the reason that the equivalents of silica and alumina compare as $3 \times 60 = 180 : 2 \times 102.6 = 205.2$, or as 9 to 10.26. In other words, 9 of silica should be replaced by 10.26 of alumina; but when taking a little more or less of one to replace the other, the error will be slight and in practice be of no influence. On the other hand, the equivalents of MnO, MgO and CaO (71 : 40 : 56) show a somewhat greater difference; but, owing to the small amounts of MnO and MgO generally found in slags as compared with lime, the error that will result from substituting one for the other, without considering their chemical equivalence, will be inappreciable.

To further illustrate that a very close substitution is not entirely necessary he states that a small variation in the composition of the slag will not to any extent influence the composition of the pig iron; on the contrary it is well known to any blast furnaceman that the same kind of pig iron in regard to silicon, manganese and sulphur can be obtained, even by varying considerably the amount of limestone added.

Hence if we neglect the question of equivalence in the substitution of the different elements constituting the slag the problem of the addition of limestone to the furnace burden resolves itself into a very simple matter. As a basis for this substitution Platz takes the percentage ratio of the sum of silica and alumina to the sum of the RO basis of a slag, which he considers as the standard in the production of a pig iron of a given composition. This percentage ratio is expressed by the fraction:

$$\frac{\text{RO bases}}{\text{Silica and alumina,}}$$

and is obtained from the composition of the chosen slag, after having deducted from it its contents of CaS and alkalies and reduced the balance to 100.

As an average ratio, well adapted to the production of foundry iron, Platz gives $\frac{52}{48} = 1.083$.

In other words, in the slag established for that particular iron the sum of the RO bases (MnO, MgO and CaO) should be 1.083 times larger than the sum of the silica and alumina. According to this ratio the limestone additions for any iron ore will be obtained in the following manner:

Establish the sum of the silica and alumina contents of the ore, multiply this by 1.083 or by $\frac{52}{48}$, subtract from it the sum of the lime, magnesia and one-half of the MnO, multiply the rest by $\frac{100}{56}\left(=\frac{CO_3Ca}{CaO}\right)$ and multiply this product again by $\frac{100}{N}$, N representing the actually free carbonate of lime obtained after having deducted from the full amount of limestone the silica, alumina, oxide of iron and moisture contained therein, as well as the amount of limestone necessary to slag off the silica and alumina.

In the case of many good average limestones n is equal to 90. With such a limestone the calculation will be simplified, considering that $\frac{100}{56} \times \frac{100}{90} \left(=\frac{10000}{5040}\right)$ or practically 2.

One example will best illustrate this. Take an iron ore of the following gangue:

	Per cent.
SiO_2 =	8.0
Al_2O_3 =	2.0
CaO =	4.0
MgO =	0.5
MnO =	1.0

Here $8 + 2 = 10$.

$10 \times \frac{52}{48} =$ 10.83. from which deduct

$4 + 0.5 + 0.5 =$ 5.00

Leaves..... 5.83

$2 \times 5.83 = 11.7$, or in round numbers = 12.

Hence the limestone addition for this ore = 12 per cent.

This ore, melted down with 12 per cent. of limestone, would give the following slag:

	Per cent.
SiO_2 =	38.4
Al_2O_3 =	9.6
MgO =	2.4
MnO =	2.4
CaO =	47.2
Total.....	100.0

Further on, Platz illustrates by some examples that this empirical formula, devoid of every scientific appearance, comes nearer to the desired limestone addition than when this latter is calculated by the usually adopted method. In this illustration he designates as No. I the ordinary method based on the ratio of oxygen of acid to oxygen of bases, and as No. II the method described. For simplicity's sake, he proposes to obtain a singulo-silicate under method I. With an average alumina content, the ratio $\frac{}{48}$ may be applied as a basis in method No. II.

In a footnote Platz states that care must be taken to deduct from the silica content of the gangue the amount of silica required to yield the silicon that enters into the composition of the pig iron. This is especially of importance in the case of foundry iron, which generally has a higher silicon content.*

Mr. Platz's examples follow:

Example No. 1.—Ore containing:	Per cent.
SiO_2 =	16.35
Al_2O_3 =	10.96
CaO =	1.45
MgO =	0.23
MnO =	18.50

This ore requires, according to method No. I, 7 per cent. of limestone.

This ore requires, according to method No. II, 39 per cent. of limestone.

The resulting slags would have the following composition:

	Method No. I. Per cent.	Method No. II. Per cent.
SiO_2 =	39.2	28.7
Al_2O_3 =	26.3	19.3
CaO =	11.7	35.3
MgO =	0.6	0.4
MnO =	22.2	16.3
Totals.....	100.0	100.0

* NOTE BY THE WRITER.—In the examples that the author submits he does not state what kind of iron was made with the corresponding slag. In some of the examples it is shown that the addition of limestone made according to method No. II is actually smaller than the amount calculated according to his established rules. This undoubtedly is due to the fact that part of the silica of the gangue was considered as supplying the silicon to the iron and therefore requires no fluxing off. But whatever this may be, we will reproduce here some of the examples submitted, in the shape they were established by the author.

Example No. 2.

Gangue of ore: SiO_2 = 6.51 per cent.; Al_2O_3 = 4.38 per cent.; CaO = 14.71 per cent.; MgO = 0.32 per cent.; MnO = 0.14 per cent.

According to method No. I there is 20 per cent. excess of limestone.

According to method No. II there is 6.6 per cent. excess of limestone.

Slag (excess of lime not considered)	Method No. I. Per cent.	Method No. II. Per cent.
SiO_2 =	41.3	28.2
Al_2O_3 =	27.8	19.0
CaO =	28.5	51.1
MgO =	2.0	1.4
MnO =	0.4	0.3
Totals	100.0	100.0

Example No. 3.

Gangue of ore: SiO_2 = 12.86 per cent.; Al_2O_3 = 0.81 per cent.; CaO = 1.72 per cent.; MgO = 0.18 per cent.; MnO = 1.45 per cent

According to method No. I, requires 38 per cent. of limestone.

According to method No. II, requires 22 per cent. of limestone.

Slag:	Method No. I. Per cent.	Method No. II. Per cent.
SiO_2 =	36.1	45.2
Al_2O_3 =	2.3	2.8
CaO =	59.4	48.9
MgO =	0.5	0.6
MnO =	2.0	2.5
Totals	100.0	100.0

Example No. 4.

Heating furnace cinder: SiO_2 = 28.8 per cent.; Al_2O_3 = 1.2 per cent.; CaO = 0.6 per cent.; MnO = 0.8 per cent.

According to method No. I, requires 103 per cent. limestone.

According to method No. II, requires 63 per cent. limestone.

Slag obtained:	Method No. I. Per cent.	Method No. II. Per cent.
SiO_2 =	34.7	45.9
Al_2O_3 =	1.5	1.9
CaO =	62.6	50.6
MgO =	0.7	1.0
MnO =	0.5	0.6
Totals	100.0	100.0

Example No. 5.

Coke ash: SiO_2 = 44.25 per cent.; Al_2O_3 = 28.63 per cent.; CaO, 4.54 per cent.; MgO, = 1.99 per cent.

This coke contains 10 per cent. ash and 1.0 per cent. sulphur.

According to method No. I, requires....56.7 per cent.
And to bind sulphur.....34.7 per cent.

91.4 per cent. limestone.

According to method No. II, requires...143.3 per cent.
And to bind sulphur..... 34.7 per cent.

178.0 per cent. limestone.

Slag	Method No. I. Per cent.	Method No. II. Per cent.
SiO_2 =	33.9	25.4
Al_2O_3 =	21.9	16.4
CaO =	25.4	44.2
MgO =	1.5	1.1
CaS =	17.3	12.9
Totals	100.0	100.0

A glance over the tables show that the addition of limestone according to method No. I is mostly out of proportion.

In the case of ores high in alumina the limestone addition is too small, yielding in blast furnaces with coke too thin slags, deficient in lime. In the case of silicon ores, the slags contain too much lime and are barely fusible.

Wtih method No. II the slags obtained are in every case much closer to what they are intended to be.

This method is, therefore, not only more correct, but it is much simpler and avoids the use of complicated tables.

Method No. II is the practical outcome of the theory established by Ledebur, which is that slags are to be considered only as solutions of oxygen compounds in each other.

Another important point to which Platz calls attention is that when silica is replaced in slags by alumina their fusibility will not be affected in any appreciable manner.

To illustrate this, Ackerman established the amount of heat necessary to melt three slags, in which silica was gradually replaced by alumina, and found that it required respectively 447, 410 and 430 heat units, or, in other words, nearly the same amount of heat for the three to melt them.

These three slags are:

	No. 1.		No. 2.		No. 3.	
SiO_2	30.27	46.77	36.88	45.35	44.94	45.39
Al_2O_3	16.50		8.47		0.45	
CaO	50.46		51.83		51.80	
MgO	1.91		1.95		1.95	
MnO	0.18		0.19		0.19	
FeO	0.59		0.63		0.67	

Platz holds that this fact is another proof of his views. The approximately correct determination of the limestone addition is of great economical importance, because it affords a better basis for the more correct valuation of the ores to be bought. It is evident that since the fuel required depends on the amount of burden (ore and fluxes), it will be an easy matter to estimate the quantity of fuel necessary to melt a certain ore, for which the correct addition of limestone can be established in a rapid and reliable way.

In this manner the methods afford an easy means to establish in advance, and very approximately, the cost price that can be obtained when using a certain ore, and inversely it will constitute a good guide to the buyer in regard to what price he can pay for an ore, in order to remain within the limits of a given cost price.

The New York Automobile Show.

The Automobile Show at Madison Square Garden, New York, which closed on January 23, was the most successful American automobile show thus far held. The New York *Herald* says that a careful estimate placed the total number of visitors to the show at from 70,000 to 80,000, though some estimates ran higher than that. Even more pronounced as a record breaker was the business done by exhibitors. In this respect the exhibition was phenomenal and is generally accepted as presaging a remarkably bright year for the trade.

Taking the foreign section first because of the great public interest in the higher cost machines, a close estimate places the number of actual sales at 43, with an average selling price of $6500. Fifty-two additional orders were booked conditional either upon a successful demonstration when the weather is more favorable or upon delivery at specified dates.

Of American built machines more than 300 sales to private owners are claimed as the week's business. Figures privately given, however, indicate that 110 will be nearer the mark, with an average selling price of $2000. Orders for as many more, probably, were placed, but conditionally, as in the case of some of the French cars.

When it comes to the closing of contracts with dealers the story is a bigger one. Every exhibitor of complete automobiles effected one or more contracts with dealers or agents for the sale of his product. In not a few cases the complete 1904 outputs of American factories were contracted for by dealers. Of the total output of approximately 25,000 automobiles the manufacturers probably have arranged for the disposal of two-thirds. Of course, that two-thirds is now available to the consumer.

While the greatest public demand undoubtedly is for touring bodies and high horse-power motors, American constructors have overanticipated this demand to such an extent that there seems likely to be a scarcity this year of the runabout type of motor vehicle.

Practically the entire runabout output was contracted for at the show, and the unusual spectacle was presented on the last day of dealers fruitlessly beseeching makers of this class of vehicle to supply them with just enough machines to gratify the most immediate requirements of their patrons.

A well informed manufacturer figured out that the contracts with dealers called for the delivery by July 1 of 12,000 American built cars, at an average selling price of $1200. This would involve $14,400,000, on a retail basis.

The lesson of the show, as told both by the display and public demand, is that the American industry is

following closer than ever before the pace of the French industry. The trend is all toward larger and heavier vehicles, with greater horse-power and protected touring bodies. More attention is given to the comfort of passengers, and details of style and finish and equipment are more carefully looked after than formerly.

Four-cylinder vertical motors now greatly predominate, the double opposed cylinder motor is next in popularity, and the triple cylinder, shown here this year for the first time, already has won many admirers. The jump spark ignition has the field almost to itself, while such conveniences as commutators in sight of the operator, motor governors, magnetos used in connection with storage batteries and force feed lubrication are becoming more common. Sliding gear transmission predominates, while in frames the race for popularity is close between the pressed steel and the frame built of plate steel and angle irons. The Mercedes type of bonnet is almost universal, though American modifications vary the designs somewhat.

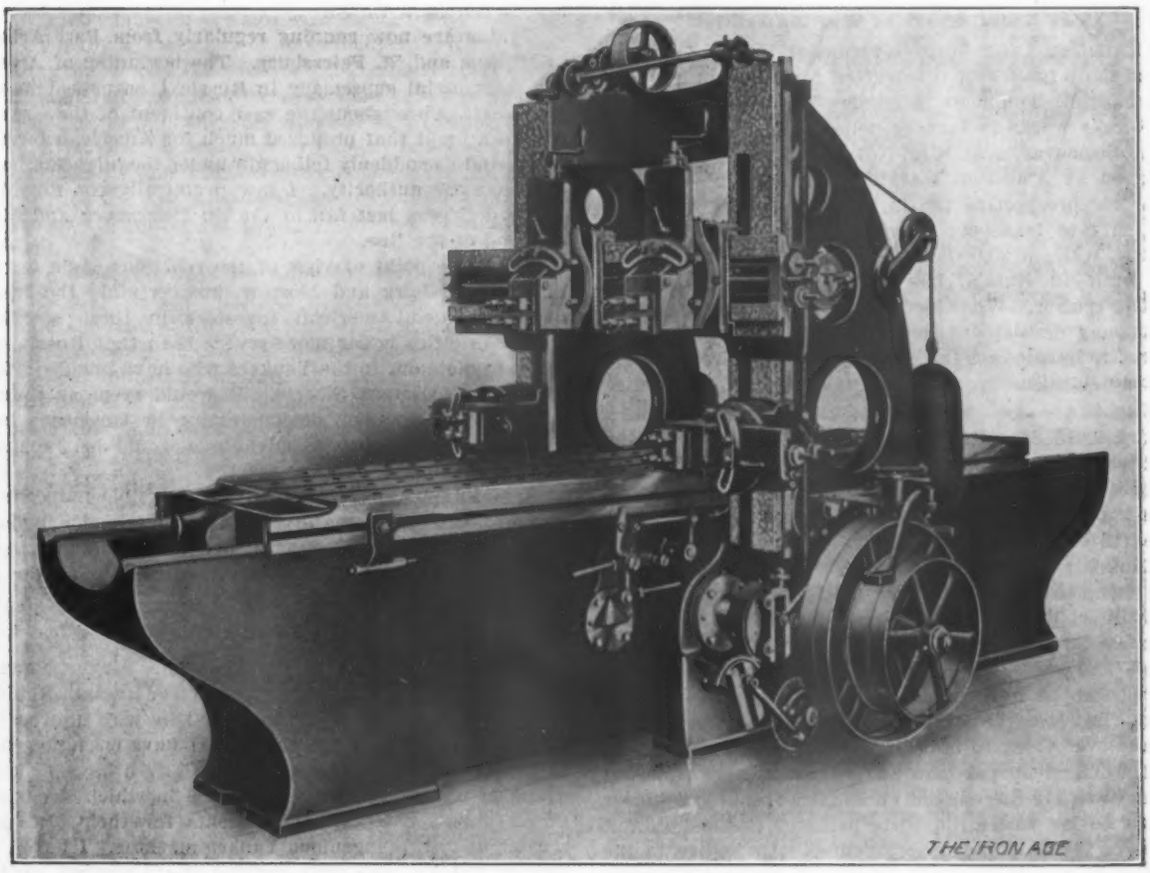
In bodies the American builders have become proficient. The canopy top is almost general, and its natural follower, the limousine, seems destined to great popularity. In running gear wheel bases are longer, wheels are larger, tires are heavier, springs are longer and heavier, and bumpers are more in evidence.

Following are statistics of some of the features: Vehicles exhibited, 258; gasoline cars, 185; chassis, 33; water cooled motors, 156; air cooled motors, 29; four-cylinder vertical engines, 82; double opposed cylinder, 42; jump spark ignition, 158.

A New American 36-Inch Planer.

Numerous new and original features and radical departures from former patterns of similar machines have been incorporated in the new American planer, in order to meet successfully the greatly increased stresses imposed by the conditions of modern methods in machine shop practice. The bed is exceptionally deep, extending full length almost to the floor line, with short substantial legs cast integrally with the bed. Great rigidity is added by the provision of heavy box cross girts at short distances throughout the length of the bed. The bed is, furthermore, very long in proportion to the length of the table, thus leaving but little overhang when planing work at full length. The central portion of the bed in the vicinity of heaviest strains is strongly reinforced.

The table is stated to be of ample proportions, well braced by ribs so placed as to give great strength without unnecessary weight. Improved dirt proof features are provided, and the driving mechanism is designed to operate for quick return motion without shock or jar. An essential feature contributing to this end is the improved form of shifting mechanism, so arranged as to positively remove one belt from its driving pulley before the other belt engages its working pulley. By this arrangement it is stated that all disagreeable shrieking of the belts is obviated. A safety locking device prevents the starting of the table before the operator is ready to have it move.



A NEW AMERICAN 36-INCH PLANER.

The tool heads are firmly secured to saddles upon the cross rail by four bolts each, as against the two commonly used. Feeds are automatic in all directions and may be controlled from either side of the machine. Side heads for attachment directly to the uprights, as shown in the illustration, may be furnished with the machine or may be added at any subsequent time with slight modifications. The slides are so constructed as to permit planing at some distance outward from the uprights. Rail heads and side heads have separate feeding mechanisms, operating entirely independently in all directions at either end of the table travel.

It is stated that the action of the planer is remarkable in its smoothness. In planing work which is afterward to be scraped to a surface, the accuracy and evenness of the cut are claimed to be such as to reduce the necessary scraping to a minimum. Other details of the machine are of conventional type and require no special description. The machine illustrated is the 36-inch size of a line now being produced by the American Tool Works Company, Cincinnati, Ohio.

American Interests in Russia.

American Investors Crowded Out.

BY A. H. FORD.

The first question I was asked on my return from Russia this winter was, "Is the Government of the Czar prepared to turn out from its workshops the necessary ordnance and war material needful for a prolonged campaign?" Judging from the seeming carelessness displayed in the larger machine shops which I visited, I should have answered promptly, "The Russian workmen are too slothful and the officials too dishonest to ever permit of that thoroughness in their foundries and machine shops that characterized the work yards I had inspected in Japan and other countries." Yet, on mature reflection, the question is one that is certainly open to argument.

The Manufacture of War Material.

At the St. Petersburg Government works American lathes, the largest ever constructed for any country, bore large cannon. Duplicate machinery has been installed at the Nevsky works to turn propeller shafts for the navy, and at Sormovar, near Nijni Novgorod, I witnessed 13,000 workmen at American machines, turning out gun carriages for prospective use in Manchuria, and first-class steel cars to transport Russian troops through hostile country, while a 20,000 horse power engine, the largest ever built in Russia, has just been completed for a Russian cruiser. What mechanical resources a war with Japan may develop in Russia, only those familiar with the recent strides of the country in this direction can begin to surmise.

Wages are low in Russia; the Sormovar works, founded in 1848, and the oldest machine shops in Russia, pay their 13,000 workmen about $150,000 a month. These works were of no great importance, however, until a few years ago, when a company of Americans visiting Russia in search of a site for locomotive works combined with the Russian works and equipped the concern with the most complete and up to date machinery then in existence. Steel bridges, locomotives, steel barges and river steamers 300 feet in length, machinery for ocean going vessels and every kind of equipment for Russian railways and workshops were turned out with rapidity and precision. But soon the unconquerable desire of the Russian to have everything to himself asserted itself, and one by one the American partners and workmen were squeezed out, until to-day there is not an English speaking engineer left to advise where duplicate parts of the magnificent pieces of machinery can be procured. In justice to the Russian workmen, however, be it said that with clumsy tools they turn out remarkably serviceable substitutes. With the marvelous and delicate tools of the American workshop the Russian is not a success, but in a land where these are not to be found everywhere he is far more useful than the most skilled Yankee mechanic, for the Russian workman has learned to make his own tools, and with these he can in time turn out a copy of anything he has seen others create.

Oil is the only fuel used at the Sormovar works, and, judging from the power generated by the large electric motors that supply the power used throughout the vast shops, coal is not needed.

Other works of equal magnitude would certainly spring up throughout Russia to enable her to prepare herself for any conflict with external or internal foes, but Russia has ceased to welcome foreign investment, and her policy of squeezing the stranger within her territory has done more to create sympathy for Japan abroad than any other combination of circumstances.

Vast docks and shipyards have been constructed at Port Arthur and Vladivostok on the Pacific, but Russia realizes that foundries and machine shops established in her far Eastern provinces at present may, in the course of events, be used to turn out cannon and war material for a Japanese army of occupation. Therefore, every pound of ordnance and ammunition must go overland, via the Trans-Siberian Railway, and if the Japanese succeed in breaking Russia's line of communication, as did the Boxers, the foundries and machine shops beyond the Urals would avail the besieged troops of Vladivostok and Siberia but little.

However, it is the probable treatment that American interests in Russia and the Far East will receive as a result of Japanese defeat that chiefly interests our business men, and since one may safely prophesy as to the future from a review of the past and present, a few facts as to Russia's policy toward American investors may not be out of place.

The Experience of American Investors.

When the first Baldwin locomotive started out from Port Arthur some four years ago over an American railway through Manchuria, I was one of the several Americans in the cab of the Yankee engine to voice a prophecy that an American commercial and Russian territorial conquest would quickly follow the Yankee locomotive across Northern China.

Trains are now running regularly from Port Arthur to Moscow and St. Petersburg. The beginning of American commercial supremacy in Russia I witnessed in the Far East. Throughout the vast continent of the Czar it rose to a hight that promised much for American foreign trade, and as suddenly fell again under the blighting hand of autocratic authority. I saw practically the finishing blows delivered last fall at the St. Petersburg and Moscow end of the line.

From the point of view of the real Slav, Asia begins at St. Petersburg and Moscow, but certainly the treatment accorded American investors in these so-called European cities is far more severe than that Russia yet dares to mete out to the Yankees who have invaded Manchuria and Eastern Siberia. It would seem as though Russia was bent upon demonstrating to Americans how greatly to their financial advantage would be Japanese success at arms in the Far East.

While Japan eagerly offers every possible inducement to Americans to become investors in the Island Kingdom, Russia is engaged in hounding from her vast continent almost the last American enterprises she has so far allowed to remain and flourish.

The Singer Sewing Machine.

Many years ago it was that the Singer Sewing Machine Company began their invasion of Russia. Rapidly the useful American invention found its way to even the most remote parts of the Empire. I have encountered it in far off Siberia and Manchuria, and even have a photograph of a Central Asian tent home in which the wives of an unruly chief stitch garments for their lord and master upon this ingenious Yankee machine. I have met Jewish traders who have carried the American sewing machine by camel caravan far into Thibet, from whence returning native traders report sales even in the sacred city of Lhassa, where the feet of no white man have trod for nearly a century. Such success caused Russian officials to smile upon American enterprise and suggest a factory on Russian soil. Now such a suggestion in Russia carries with it the assurance that if not favorably acted upon import dues will be levied that will force the foreign manufacturer to terms. At present there is a magnificent Singer sewing machine factory at Moscow, and almost my first view of the Russian capital included the one modern office building in all Russia, that the company are erecting on the Nevsky Prospect. All of this display of wealth, it is needless to say, has excited the cupidity of the Czar's tax collectors, and, when it is also taken into consideration that American enterprise in Russia is held largely responsible for the spread of revolutionary doctrines, it is not surprising that the reactionists now in power have organized a campaign of petty annoyances to either drive the American company out of Russia or force them to sell at a sacrifice, either direct to the paternalist Government or to some purely Russian company.

Russian Chicanery.

Now, all men are not wise in all things at all times—not even Yankee investors—so it came about that to curry favor with the Government the Singer Sewing Machine

Company took the almost fatal step of depositing their receipts with the Imperial Bank. Promptly the tax agents demanded of the State bank access to the accounts of the American company. The officers of the Singer Sewing Machine Company were officially informed that as they were depositing large amounts of money they must pay the Government larger taxes. In vain the directors pointed out that the deposits were gross receipts, not profits, and that, moreover, the company were paying their full quota of taxes demanded by law. Not being able to refute the latter statement, the Government officials retired and consulted, with the result that they returned with a demand that the exact collections of each and every one of the thousands of sales agents throughout Russia be reported to the Government. This would entail, of course, the employment of a large number of accountants, as the amounts collected are often not more than a few kopecks; and, being a manifest impossibility, the company flatly refused.

The next move of the Government was a threat to tax the company a thousand or more rubles for each agent, on the ground that, the stock of the company being owned by foreigners, their agents were drummers for foreign goods and subject to the heavy tax imposed on all foreign salesmen in Russia. I found, upon careful inquiry, that the experiences of this company are comparatively mild compared with the treatment meted out to some other Yankee concerns attempting to conduct business in Russia at present.

In a thousand ways the American investor is made to rue the day he first thought of establishing a branch plant in the land of the Czar, and what, in the eyes of the American colony in Russia, is far more needful to the permanent industrial welfare of Russia than the Czar's arbitration court is an international industrial court of appeals that will have power to enforce fair treatment toward all investors of foreign capital in the great Slavonic continent.

Japan has set an example that her sluggish, semi-Oriental sister may do well to follow, yet American capital seems to fight shy of the Mikado's kingdom, while it flows in a steady stream toward Russia, where the enthusiastic investor finds too often that it is a case of the fool and his money soon parted.

The prophecy made in Manchuria has been brought to naught by the action of the reactionists in power at St. Petersburg; it remains to be seen, therefore, if America will be compelled to throw her interests in the balance with those of England and Japan to secure a fair share of the commerce of Asia.

Knowing Asiatic Russia as a well worked and profitable field for American enterprise, I entered the great European State at the time of Minister de Witte's recent downfall, only to find that America's commercial boom in the great Russian continent had burst, gone out, as it were, like a bubble pricked by a pin.

At St. Petersburg I found the Russians one and all discussing the downfall of de Witte, the ex-Minister of Finance and present President of the Imperial Senate. Every one was picturing the new Prime Minister, deprived of his vote, sitting at the head of the deliberative council, without voice, observed only when he struck the bell to call the body to order; but de Witte was off scouring the world to raise more money for Russia before his enemies had an opportunity of seeing him sit tamely at the head of the council table, and the talk once more drifted back to the finances of Russia and the possibilities of ever again interesting foreign capital after the lamentable past experiences of French and Belgian capital in Russia and the present trials and tribulations of the American companies located there.

Despite our recent ill luck in the land of the Czar and the persecutions to which our commercial enterprises have been subjected by Russian officials, I was informed on the very day of my arrival in the Russian capital that emissaries of a combination of American capitalists had just returned from looking over the field and that it is quite within the range of possibility that mammoth works for the manufacture of American agricultural machinery may soon be erected in Russia, where more than a third of our total exports of agricultural implements find their way. Inquiry corroborated the report that the ground has been overlooked, and unless the projectors of the scheme take warning from the recent unjust treatment of American enterprises in Russia by the Government officials, one more Yankee plant may be captured *in toto* by the too zealous servants of the Czar and turned into a purely Government enterprise by the paternalist party now in absolute power at St. Petersburg. From time to time, ever since the tariff tiff between Mr. Gage and the now ex-Minister of Russian Finance, de Witte, rumors have reached America of unpleasant squeezes to which Yankee promotors have been subjected in the land of the Czar. It was to trace these rumors to their source that I visited Russia, and as the American colony seems unanimous in the opinion that not even the outgoing friendly minister could refrain from taking advantage of his American guest when, in his opinion, it best served the interest of his Government to do so, we may just as well first as last look the facts in the face as they exist in Russia to-day. The Government interests itself directly in every foreign enterprise, with a view to converting it into a purely Russian affair; nor are the servants of the Czar particular as to the methods used. From de Witte down results have been all that was looked for, Russian officials frankly admitting the charges of discriminating against American enterprises, and the Americans who have founded machine shops and factories in Russia are forced to realize that their progressive methods, instead of setting a pace, have startled the Russians to a degree that has worked the downfall of almost every Yankee venture in European Russia.

The Westinghouse Plant.

I have spoken of the Sormovar works on the Volga, where a few years ago an American company equipped with Yankee machinery the most extensive and complete locomotive works in all Russia, where, however, the promotors, investors and workmen of American persuasion have been gotten rid of, until to-day in these vast works, employing some 13,000 men, not an American is to be found. At St. Petersburg I was regaled with the trials and tribulations of the Westinghouse Air Brake Company in Russia, another object lesson to any American capitalist who looks upon Russia as a field of great returns. What a flourish of trumpets when this Yankee concern secured contracts from the Russian Government for supplying all the railways with air brakes—merely on condition that they erect workshops in Russia. Up went a factory that gave employment at one time to nearly 1000 workmen. Under the patronage of Minister de Witte the company was enabled to pay enormous dividends. Rumors reached America that this was to become the greatest factory in all Russia; it was even positively announced that the Russian Government had granted a million dollar subsidy to aid the Westinghouse people in the erection at St. Petersburg of the most perfectly equipped electrical equipment plant in all Europe. But the real facts, as I found them, were that in place of subsidies came gentle hints from the Russian government that caused the discharge from the air brake works of all American workmen and employees and the filling of their places with Russians. This was followed by promises that caused the New York Air Brake Company to erect extensive rival works at Moscow. The promises have not been kept, so that affairs at the Moscow works are in a bad way, and one of the ex-Minister's last acts was to strike from the annual appropriation list a million dollars for the coming year's supply of air brakes. In vain the Westinghouse officials protested that the Government was bound by contract to take a certain number of brakes annually. Smilingly and suavely the great minister assured the official that the Government would be only too glad to take the air brakes, but that there would be no money forthcoming to pay for them. Down dropped air brake stock, and it seemed as though the policy of playing the two companies one against the other would successfully land one of them in the fold of purely Government works, so that the Czar could manufacture his own air brakes, but it is evident that de Witte reckoned without his host, for I am reliably informed that the sharp Yankees who have their money invested in the works at St. Petersburg have a trump card up

their sleeve which will tend to confound Russian plans when it is played.

De Witte often gave new enterprises started on Russian soil by foreign capital liberal aid from the Government vaults, with motives ulterior, perhaps, but I was positively assured by present Russian officials that no aid whatever can be expected from the reactionary party now in absolute power. These men, truly devoted to the interests of their home industries, bluntly informed me that in time Russia, through her tariff, will find a means to force the Yankee manufacturers of American agricultural machinery to erect and equip extensive plants in the Czar's domain. Why, therefore, the harvester and reaper people should rush in before they are compelled to make the move puzzles every American resident in Russia who has had any business dealings with the Slav Government.

Russia needs our agricultural machinery to enable her to supply her army with flour and at the same time permit her to draw new army recruits from among the peasants. Still more she needs foreign aid and capital in the development of her foundries and machine shops. A war with Japan may teach her how dependent she is on outside aid, and prove, in the long run, the greatest blessing to the Russian people and to those with whom they have business dealings.

A New Reheating Furnace.

In a recent number of *Stahl und Eisen*, Thomas Stapf of Ternitz, Austria, describes an improved reheating furnace patented by him. The article contains some interesting notes on reheating furnaces in general, and the new invention in particular, a summary of which is here reproduced.

The cost of reheating iron or steel is made up of three items: 1, fuel; 2, furnace loss; 3, labor and sundries. Of these the first two constitute the greater part of the total, and they only will be considered at the present time.

The earliest means to raise iron to a working temperature was the open fire, charcoal being the fuel most generally used. The amount of fuel used was enormous, but, owing to the fact that each piece was carefully watched by the workman and removed from the fire immediately on reaching the necessary temperature, the loss was reduced to a minimum. The furnace heated by a grate fire was the first step in advance, whereby much fuel and labor were saved, but coupled with this saving was an increased furnace loss, due to the fact that, as all the pieces constituting a charge reached the working temperature at practically the same time, some of them had to remain "sweating" in the furnace while the others were being worked. The introduction of gas as a fuel, and particularly of the regenerative principle, enabled another great reduction in the cost of heating to be accomplished. A cheaper fuel could be used, less of it was needed and the loss was decreased, owing to the shorter duration of the operation.

The modern reheating furnace is, however, far from being an ideal means to the end in view. One great fault is that, as generally constructed, the temperature of all parts of the hearth is the same, whereby the disadvantage of the grate fired furnace, mentioned above, is perpetuated. Nearly all regenerative furnaces of the present day labor under the following disadvantages:

1. The hearth is too short to allow the flame to transmit as much of its heat to the material as it might do advantageously. This causes loss of heat and large fuel consumption, and an unnecessary amount of heat passes into the regenerators. The result is that gas and air are heated hotter than is necessary to effect immediate complete combustion, which causes a long flame, reaching half way through the checkers, and consequent loss of heat up the stack. Longer hearths have not been generally used, as an equal temperature in all parts of the furnace has been aimed at, and also because they would necessitate heavier charges, taking longer to heat and causing a greater loss.

2. The difference in temperature between the heat giving and heat taking bodies is too small, especially during the latter part of the operation. The great initial difference diminishes rapidly and disappears entirely as soon as drawing begins, at which time the temperature is kept down. The latter object is generally attained by decreasing the stack draft and also the supply of air, causing the formation of a reducing flame. This entails a great waste of fuel, more especially as drawing takes from 25 to 50 per cent. of the total time of the heat. From the above it is plain that the amount of fuel used is considerably in excess of that actually required to heat the metal.

3. The charge, on account of the long hearth, is much bigger than is favorable for a small loss. The loss of iron by oxidation is greater the higher the temperature, the more extensive the surface exposed and the longer the time of exposure. The minimum loss would take place if each piece could be drawn the moment it reached the temperature necessary for working, which is, of course, impossible under modern conditions, all the blooms having practically the same degree of heat. The time taken to draw the charge, and therefore the loss, is greater the heavier it is and the smaller the pieces constituting the same. To achieve the minimum loss a very small furnace would be necessary, in order that the charge should be as small as possible. This remedy is impracticable, as the decreased loss would be gained only at the cost of an increased amount of fuel. The general practice as to size of hearth is a compromise between a large hearth, favorable to small fuel consumption, and a small hearth, favorable to small loss.

4. In the usual type of reheating furnace the principle of "opposite currents" is practically neglected, although a recognition of the same would greatly increase efficiency. Continuous and revolving (Pietzka) furnaces make use of the principle.

5. The first mentioned fault—namely, too high temperature of the gases leaving the hearth—leads to an unnecessarily rapid destruction of furnace, regenerators and valve system.

The above evils apply also to coal fired furnaces, some to a greater degree than to gas fired. This is particularly true of point 2, as the temperature of the flame is lower and consequently the difference in temperature less. The lower initial temperature is sufficient to account for the lower efficiency of this type of furnace as compared with the Siemens system. This disadvantage can be counteracted to a certain extent by using the waste heat for the production of steam; but most practical men, in America at any rate, will probably regard this remedy as worse than the disease. The loss is also greater with coal firing, as the heat is less under control.

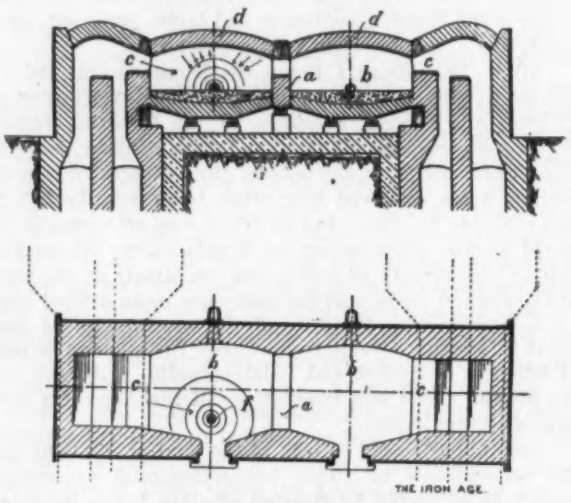


Fig. 1.—The Stapf Reheating Furnace.

Stapf's construction, described below, gives more favorable results, both as regards coal consumption and loss of metal. This furnace, shown in Fig. 1, has a hearth 50 per cent. longer than customary, divided in the center by the bridge *a* into two equal portions *b b*. The ports are

so inclined toward the hearth and the rof is drawn down toward *a* in such a manner that the flame and heat radiated from the roof cause a concentration of heat at a certain point, *f*, of the hearth *b*. This hot zone is situated at a point where the workman can turn the steel, and its dimensions vary according to the size of the bloom or billet generally used.

The charge is divided into two, the first half being put in that end of the furnace which is connected with the stack. When this is partially heated the direction of the gases is reversed, so that the steel comes in contact with the hotter part of the flame, and the second half of the steel is put in the other end of the furnace. The first piece of the first half charge is brought into the hot zone, turned till it is of an even temperature throughout, and then drawn, making room for the next piece, and this is continued till that end of the furnace is empty. In the meantime the second half is continually gaining heat, and finally, immediately after or shortly before the last piece of the first half is drawn, this second half is brought into the hot zone by reversing. The first half is then recharged while the second half is being drawn.

The reasons for the practical superiority of this construction over that which is generally used are as follows: First and foremost, the increased length of the furnace allows the gases and products of combustion to give up more of their heat to the furnace and its contents, and therefore to leave the same at a lower temperature. The length of the furnace should be such that the heat leaving more available for the second half; so that, in spite of the increasing heat of the steel, the difference in temperature between that and the gases remains relatively high.

As may be seen from the above, the new furnace embodies the principle of "opposing currents" to a high degree.

The results of one month's work, October, 1903, with a furnace of the type described are given below. The furnace, built in 1899, has regenerators for air only, the gas coming hot from the producers, which use Silesian coal, 6800 calories. The hearth surface is about 68 square feet.

Turns (12 hours)		48
Half charges		1,192
Coal used (exclusive of that used for heating up), net tons		1,224
Charged: Wrought iron, pounds	1,095,750	
Steel, pounds	839,225	
Total, pounds		1,934,975
Production:* Wrought iron, pounds	978,875	
Steel, pounds	804,390	
Total, pounds		1,783,265
Coal used (per cent. of charge): For wrought iron		14.58
For steel		10.21
Loss (per cent. of charge): Wrought iron		10.67
Steel		4.15

* Of this production, 237,391 pounds wrought iron and 4934 pounds steel were reheated twice, thereby increasing both fuel consumption and loss.

The inventor gives the following data as means of comparing his furnace with other types:

	Coal consumption. Per cent. of charge. Wrought iron.	Coal consumption. Per cent. of charge. Steel.	Loss. Per cent. of charge. Wrought iron.	Loss. Per cent. of charge. Steel.	Daily capacity per square meter hearth (charging cold). Wrought iron. Gross tons.	Daily capacity per square meter hearth (charging cold). Steel. Gross tons.	Efficiency. Per cent.
Open fire	70 and up.	(Charcoal.)	6 to 10	....	..	..	Under 5
Direct coal firing	40 to 70	30 to 50	12 to 15	4.5 to 5.5	3	4.5	5 to 10
Bicheroux type gas firing	25 to 45	18 to 25	11 to 14	3.5 to 5	4	6	10 to 15
Siemens firing, early type	20 to 35	16 to 20	10 to 14	3 to 5	5	7	14 to 18
Siemens firing, later type	16 to 25	13 to 18	10 to 14	3 to 5	5.5	7.5	15 to 19
Continuous furnaces	....	12 to 16	....	2.5 to 4.5	..	10	16 to 20
Pietzka furnaces	15 to 22	11 to 15	9 to 13	2.5 to 4.5	6	8.5	17 to 25
Stapf's system	11 to 16	7.5 to 12	7 to 12	2.2 to 4.2	7	10	20 to 30

imparted to the checker work is just sufficient to enable the latter to raise gas and air to a point which will insure complete combustion at their first meeting. The flame is thereby made as short as possible, tending to a longer life of furnace, checkers and valve system, and less loss of heat through the stack. To avoid making the gain in fuel illusory by an increased loss of metal three means of prevention are used: 1. Division of the furnace into two parts, each of which is smaller than the furnaces generally used. 2. Construction of the ports and roof in such a manner that the blooms constituting a charge do not all attain the same temperature at the same time. 3. The method of working, described above—that is, charging the halves of the furnace alternately and reversing gas and air each time one-half is emptied. By these means it becomes possible to withdraw each piece of steel as soon as it reaches the desired temperature, and the "sweating" period (during which nearly all the loss takes place) is reduced to a minimum. Furthermore, the average difference in temperature is the greatest possible, as only a part of one-half of the charge is at the working temperature at any one time. This fact causes more rapid work and adds greatly to the efficiency of the furnace. The further advantage is gained that, as there is no period during which the charge may not take up more heat, it is not necessary to lower the temperature by causing incomplete combustion of the gas, which is equivalent to wasting fuel.

The gases crossing the dividing bridge are coldest at a time shortly before drawing from the first half of the furnace begins, just when the freshly charged steel is in the other half. As a consequence the difference in temperature between gases and steel is great, in spite of the comparative coldness of the former, and heat is rapidly absorbed by the metal. As the blooms are drawn less heat is absorbed in the first half of the furnace,

The National Building Trades Employers' Association.

The Executive Committee of the National Building Trades Employers' Association met at the Sherman House, Chicago, January 19, 20 and 21. This committee had been empowered by the National Association, which met in Chicago December 10, 11 and 12, to perfect the somewhat tentative organization made at the larger convention. The Executive Board, among other things, passed on the report of the special Committee on Constitution, and while the officers refuse to make public their constitution, they state that it does not deviate materially from the eight cardinal principles adopted by the convention itself and published in *The Iron Age*, except that a modifying resolution was adopted which made it understood that existing agreements between contractors and union labor should not be interfered with, even though they were not in harmony with the constitution, but that at the expiration of such agreements compliance with the cardinal principles of the constitution should be insisted upon. It was decided to hold the next annual convention in Detroit the third Tuesday in January, 1905. A resolution was adopted protesting against the anti-injunction and anti-conspiracy bill now before Congress which is being championed by members of labor unions. Members of the Executive Committee who attended the Chicago meeting were as follows: President, Wm. D. O'Brien, Chicago; secretary, E. M. Craig, Chicago; C. J. George, Detroit; J. H. Harte, Omaha, Neb.; J. M. Hartwig, Peoria, Ill.; G. H. Asire, Logansport, Ind.; James L. Parsons, Washington; H. C. Wood, North Adams, Mass.; H. R. Edwards, Racine, Wis.; J. L. Strassel, Louisville; Milton Council, Topeka, Kan.; J. C. Wilson, Pittsburgh; W. H. Keighley, Pittsburgh; L. D. Campbell, Duluth; J. H. Miller, Baltimore,

Md. The Committee on Constitution was as follows: R. A. Edgar, Colombus, Ohio; Chas. F. Buente, Pittsburgh, Pa.; John Bonnett, Milwaukee, Wis.; P. C. Campbell, Grand Rapids, Mich.; Adam Bauer, St. Louis, Mo.; H. C. Wood, North Adams, Mass.; F. T. Houx, Sioux City, Iowa; C. F. Byrne, Chicago; J. H. Miller, Baltimore, Md., and R. M. Abercrombie, St. Joseph's, Mich.

The Canadian Parliament to Meet.

TORONTO, January 16, 1904.—Contrary to expectations generally entertained up to the end of last week, the Government has decided to hold another session of the present Parliament. Its purpose undoubtedly was to bring on the general elections next month, and the campaign was more than incipient when the chief ministerial organ on Saturday announced that there would be another meeting of the Houses. This puts a stop to the holding of party conventions and the choosing of candidates that had been going on so briskly on both sides. The reason given for the sudden change of purpose on the part of the Government is the necessity for renewing or revising the legislation of last session pertaining to the National Transcontinental Railway Line. The time limit had passed before the $5,000,000 deposit was put up, and when it was pledged a month later it was not in the form—cash or Government securities—prescribed by the act. Moreover, the form in which it was presented—guaranteed 4 per cent. stock of the Grand Trunk Railway Company—was contrary to the act authorizing this issue, as that statute restricted the employment of the stock to certain specific uses, which excluded its deposit in behalf of the Grand Trunk Pacific Railway Company. So the construction of the road cannot be proceeded with until fresh powers have been given to the Government and the company by Parliament. Hence the necessity of the session.

It is commonly believed that there will be some tariff revision in the coming session, which is to be called in March or earlier. It has been quite freely stated that promises have been made to certain sections of manufacturers that their interests will be provided for. It is not easy to believe, however, that the revision will take in many articles of the tariff. The steel and iron schedule may come in for some changes, and possibly woolen goods will be better protected against British competition.

Trade Relations with Germany.

One piece of business that seems likely to come before Parliament is that of the country's trade relations with Germany. The surtax has brought the Government of that country to a state of mind more favorable to negotiation. It will be recalled that the commercial treaty between Germany and Great Britain was denounced in 1897 by the latter at the instance of the Canadian Government, and was duly terminated. Canada had just granted a preference to Great Britain, and Germany claimed equal treatment under the most favored nation clause of the convention, to which Canada was a party in association with Great Britain. To bar Germany from the preference it was necessary for Canada to withdraw from the treaty, and to release Canada Great Britain herself had to withdraw. All this was done. Britain at once entered into negotiations for a new treaty and sought to have Canada included in its benefits, but Germany would not consent unless the preference allowed to Great Britain was extended to Germany. To that the Canadian Government would not agree. Germany then struck Canada's name off the conventional tariff list, thus practically prohibiting the importation of Canadian cereals. There was retaliation for five years, Canada making efforts from time to time to obtain more liberal treatment in return for the moderate duties which it imposed on German products. Failing to get better terms, the Canadian Parliament last April imposed on all dutiable German goods a surtax equal to one-third of the regular tariff rate. Germany has felt the extra impost, and has lately made overtures to Canada for negotiations having for their object a commercial treaty on the lines of that now existing between Canada and France. The German Foreign Office has been referred by Sir Wilfrid Laurier to the British Government, through whom the initiative must be taken, as Canada is nominally without the treaty making power.

Exports and Imports for Five Months.

The Government reports that in the first five months of the current fiscal year the value of the merchandise entered for consumption in this country was $104,286,603, as against $86,840,081 in the corresponding period of 1902-3. This increase is regarded in trade circles as a consequence of the more aggressive prosecution of business on the Canadian market by United States manufacturers. Undoubtedly Canadian orders are more welcome to many workshops across the line than they were a twelve month ago, and American selling agents are certainly quite active here in many lines, but it is questionable if they are slaughtering prices so recklessly as some of their domestic competitors allege. When full allowance has been made for the general drop in prices in the United States, it will probably be found that there is little of the American gain here left to be accounted for by any other theory. Special sacrifice prices would perhaps not have to be resorted to largely in order to increase American sales in Canada. The whole explanation seems to be contained in the statement of fact that conditions have changed. A year ago there was no embarrassing surplus of American manufactures pressing upon this market. There was rather a dearth. Now there is plenty of American product for export, and Canada more easily gets its demands satisfied from that quarter. And it may be a fact that Canadian orders are as profitable to the American sellers as are American orders. If there is special price cutting to capture this market, Americans are not the only ones who have a hand in it. American and British steel makers competed for the contract to supply 6000 tons of steel rails for the Ontorio Government's Temiskaming line, and a British house got it. And it did not have any tariff advantage, for there is no duty on steel rails, so there was no preferential discount in its favor. True, the Ontario Government says there was a sentimental preference, but it is pretty generally believed that the sacrifice made to give the order to the British company was nominal, the British price being not much higher than the American. In the five months ending with November there was imported steel rails of the total value of $2,445,252. Of this total the imports from the United States made up only $364,291, Britain's part being nearly four times as great, aggregating $1,363,939. Germany is credited with $320,141 under this head and other countries with $396,890. Some of the imports from the United States in the five months period are as follows:

Parts of cars	$108,125
Clocks	108,606
Electric apparatus	613,445
Motors, &c	198,110
Harvesters	357,544
Horse rakes	51,410
Mowing machines	95,950
Plows	38,199
Parts of agricultural implements	186,958
Bar iron and steel	231,714
Canada plates, &c	154,186
Railway engines	1,002,928
Gasoline engines	82,739
Steam engines	204,877
Iron pipe fittings	160,435
Iron and steel forgings	46,160
Hardware	261,474
Iron and steel bridges	79,896
Pig iron	149,932
Locks	77,657
Automobiles	54,491
Portable engines	354,021
Threshers	251,047
Sewing machines	133,951
Typewriters	96,169
Other machines	2,057,249
Nails	70,453
Plow irons	71,982
Pumps	105,739
Railway bars, &c	28,504
Fish plates	39,996
Structural forms	217,536
Steel sheets and plates	154,147
Skelp iron and steel	71,834
Stoves	152,062
Wrought iron and steel tubes	147,978

Safes	38,109
Sundry tools	301,874
Other iron and steel goods	892,241
Light fixtures	80,048
Lamps	165,541
Tinware	49,818
Watch cases	47,450
Watch actions	274,244
Binder twine	680,567
Wire rods	264,720
Mining machinery	485,274
Steel rails	364,291
Barb wire	149,681
Galvanized wire	93,441

In all the articles mentioned in this list, excepting steel rails, the United States has far the largest part of the trade, practically distancing its competitors in most of them.

Minor Notes.

Samuel Coulson, vice-president and former president of H. R. Ives & Co., hardware manufacturers, Montreal, died very suddenly in Toronto several days ago.

On the 8th inst. the blast furnace of the Londonderry Iron & Mining Company was lighted, and a small cast was made on the 10th. This is the first pig iron made in Londonderry, N. S., since 1896.

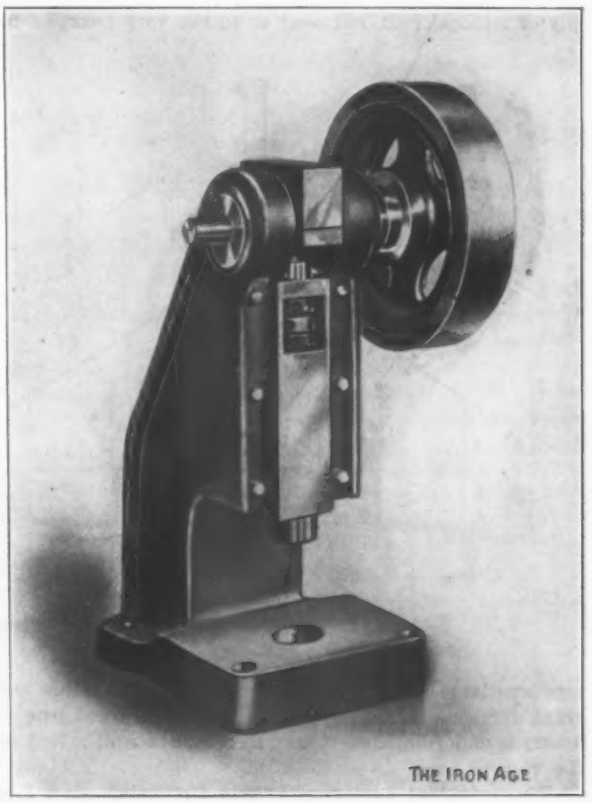
The blast furnaces of the Nova Scotia Steel Company, at Sydney Mines, N. S., are about completed, and are expected to be blown in this month or next. Good progress is being made, too, with the open hearth furnaces. There are to be four of these, one of them having a capacity of 50 tons, each of the other three being good for 40 tons per day. The whole works are to be ready for operation next summer. C. A. C. J.

A Boiler Letting Controversy in Chicago.—In November the city of Chicago asked for bids on furnishing six 250 horse-power internally fired boilers with Morison corrugated furnaces, to be equipped with automatic stokers, coal bunkers to carry 600 tons of coal, automatic coal and ash conveying machinery, together with all the pipe fittings, &c., necessary for complete installation of the boiler plant at the Fourteenth street water works pumping station. Four bids were submitted, as follows: S. Freeman & Sons Mfg. Company, Racine, Wis., $95,000; J. G. O'Neil, Chicago, $98,000; John Mohr & Sons, Chicago, $98,000; Springfield Boiler & Mfg. Company, Springfield, Ill., $126,000. The contract was awarded to S. Freeman & Sons, the lowest bidders, but John Mohr & Sons enjoined the officers of the city of Chicago from executing the contract, claiming that the city did not furnish plans with its specifications that were sufficiently definite. The case was tried in chancery before Judge Brown, and, after a spirited contest of four days, decision was rendered in favor of the city and S. Freeman & Sons Mfg. Company. Later the plaintiffs attempted to have the matter taken up with the State's Attorney, but that officer declined to interfere with the finding of Judge Brown. In the judicial proceedings Mr. O'Neil was given second place, because his bid furnished more than the other bidder whose figure was the same. The bid of the Springfield Boiler & Mfg. Company included steel and cement coal bunkers, instead of steel only. All bidders based their guarantees on the application of Hawley down draft furnaces, although the Hawley was not specified in the city's proposal. It is likely that the Hawley down draft will be adopted, as it is in use in all the other modern Chicago pumping stations.

The commission recently appointed by the Canadian Government to investigate the different electrothermic processes of manufacturing iron and steel in Europe, sailed from New York, January 23, on the Cunard Line steamer Lucania, for Liverpool. The commission consists of Dr. Eugene Haanel, Superintendent of Mines in Canada; C. E. Brown, electrical engineer; M. Nystrom, draughtsman; Thomas Cota, secretary, and a steel expert and photographer, who will join the party in England. The purpose of the commission is to investigate all existing plants in Europe, in view of promoting the industry in Canada, where it is thought that the many undeveloped iron mines, in which the country is so rich, can be worked to great advantage by energy derived from water falls which are to be found in great numbers throughout the Dominion. These few electro-thermic plants are scattered over Sweden, France and Italy, and it is probable that many months will pass before the commission will finish its work of inspection and research.

The Cross & Speirs Power Foot Press.

In heavy foot press work the force required is sometimes too great for the strength of the operator when no power is supplied for driving the machine. To meet such cases, there has been designed a foot press similar in general style to the ordinary foot press in having a single slide or gate and a die bed surface of the usual form. In other respects, however, the machine differs materially from foot presses in common use. The illustration shows the machine without the treadle, which, however, is of the usual form.



THE CROSS & SPEIRS POWER FOOT PRESS.

On the shaft of the machine is a clutch, whose action is such that when the treadle is depressed to close it only one operation of the press can be obtained, even though the treadle may be held down; *i. e.*, for each working stroke of the press it is necessary that the treadle b raised and again depressed. This feature is provided for by the placing of a pin so as to knock off the connection after one working stroke is made, and making it necessary that the treadle be allowed to rise before the clutch can again be engaged. By removal of this pin, however, the clutch may be used in the ordinary way and the slide made to give successive strokes so long as the threadle is held down.

No pitman is used in this machine, the operation being upon the Scotch yoke principle, as clearly shown in the illustration. The yoke, within which works the sliding block fitted to the crank of the shaft, is rigidly, yet adjustably connected to the ram. Lock nuts turned by means of a suitable spanner wrench afford the necessary means for adjustment of this feature. Power is delivered by belt directly to the fly wheel pulley mounted upon the overhung end of the crank shaft at the right of the machine. The makers are the Cross & Speirs Machine Company, Waterbury, Conn.

A New Charcoal Retort Plant.

BY ERNST A. SJÖSTEDT, SAULT STE. MARIE, ONT.

Looking over the statistics of the pig iron production in the United States, we are at once struck by the rapidly and ever increasing volume of the whole, and also by the comparatively small and constantly decreasing percentage to which the charcoal iron production enters into the totals. Going back 25 years, the following figures, in round numbers, present themselves:

Averages for the years—	Total pig iron production. Gross tons.	Charcoal iron production. Totals. Gross tons.	Percentage of total.
1876-1880	2,500,000	330,000	13.2
1881-1885	4,300,000	500,000	11.6
1886-1890	7,100,000	550,000	7.8
1891-1895	8,100,000	250,000	3.1
1896-1900	11,500,000	300,000	2.6
1901	15,900,000	360,000	2.2
1902	17,800,000	380,000	2.1

For a country like the United States, with some of the largest ore deposits situated remote from the sources of supply of mineral fuel, but near or in the very heart of forests available for the production of charcoal, this constant decrease in the importance of the charcoal iron industry is abnormal, and it may therefore be well to look for the cause.

The principal factor governing the value of a merchandise being the demand for it, and its quality and character as compared with other material available for the same purpose, we will now consider how the charcoal iron fills these conditions. Owing to its greater freedom from the most baneful element present in iron—namely, sulphur—the superiority of charcoal iron to iron made from impurer mineral fuel is self evident, and the demand for this class of iron would, therefore, be so great as to drive the mineral coal iron to the wall, the supply and cost of the two classes of iron being equal. The very marked decrease in cost of manufacturing pig iron with mineral coal, while the cost of producing charcoal pig has practically remained stationary, has had its natural consequence, causing the dearer iron to be partly or wholly dispensed with, even in such industries as the manufacture of malleable iron and car wheels, in which prudence and safety in many cases still would dictate a partial or entire charcoal iron charge. The greater cost of manufacturing charcoal iron as compared with that of producing iron with mineral fuel thus being the greatest obstacle in the way of the charcoal iron industry, and the fuel being the principal item making up the higher cost, it follows that any reduction in the cost of the charcoal would tend to narrow the gap now existing and to enable the charcoal iron makers to recover some of their lost ground.

Such a reduction in cost, fortunately, is now made possible by a system of carbonization which not only will yield the largest amount of charcoal, but will also recover the largest percentage of by-products obtained from the dry distillation of wood, the values of which are such as to practically cut the old price of charcoal at least in two. Such a system has been adopted by the Algoma Steel Company, Sault Ste. Marie, Canada, in connection with their blast furnace plant; and the highly satisfactory results obtained, and the ease and cheapness with which the carbonization of wood on a very large scale is carried on, will, we think, make a description of this plant both timely and interesting.

Instead of the small 1-cord pear shaped vertical retort adopted by Mathieu, or the 9-foot by 50-inch standard boiler shaped retorts used by some manufacturers of wood alcohol, or the 5-cord retort ovens lately introduced at some charcoal and chemical plants, the retorts adopted at Sault Ste. Marie are horizontal steel shells, 46 feet long, 6 feet 3 inches wide and 8 feet 4 inches high, made of ⅜-inch plate, and provided with a double set of doors at each end, hinged on heavy cast iron fronts, firmly riveted to the shell, with which they form an air tight seal when closed. A railway track of standard gauge runs through each retort, and the wood to be carbonized is loaded on low truck iron cars, A, Fig. 1, holding 2 cords of wood each, and provided with a skeleton iron frame to keep the wood and the resulting charcoal in proper place. Four of these cars, properly loaded, will neatly fill the space of a retort, B. These retorts, of which there are 20 here, are set in and between brick walls, in a manner similar to the setting of steam boilers, and under each end of each retort there is a fire place, *m*, with ash pit, *n*, and the flues are so arranged as to evenly distribute the heat of carbonization around the retort before the combustibles reach the individual chimney *f* with which each retort is provided. After the wood—

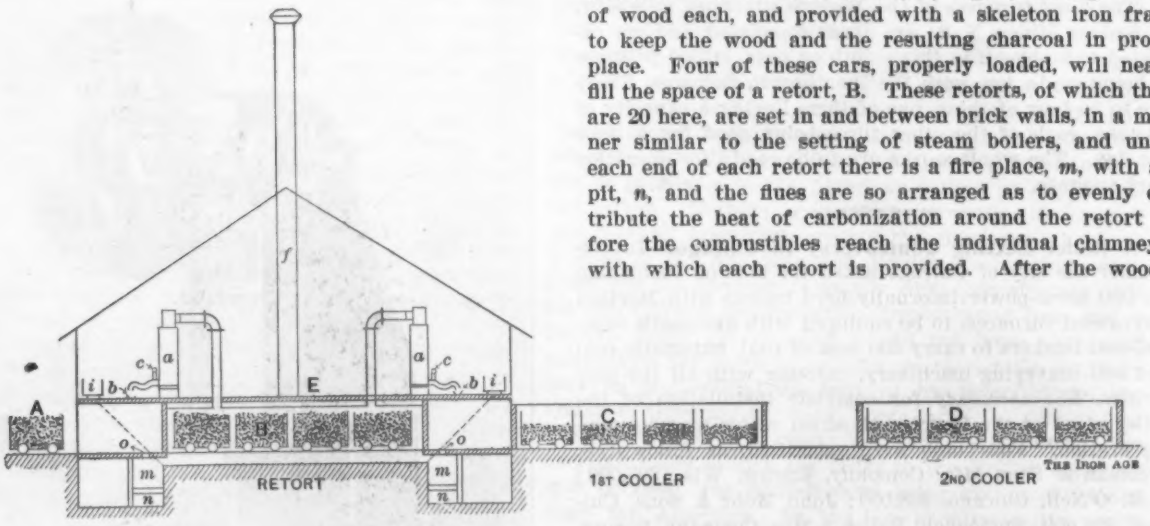


Fig. 1.—Elevation of Charcoal Retort Plant, Algoma Steel Company, Sault Ste. Marie, Ont.

preferably well split and seasoned—has been loaded on the cars, four of them are pushed into the retort, the doors at each end are closed, the fires are started in the "Dutch ovens" and the heat of carbonization maintained for 18 to 20 hours, during which time the gases of distillation are drawn off as formed, first passing through a set of copper condensers, *a*, where the condensible gases are brought into liquid form (pyroligneous acid), while the noncondensible gases (illuminating gases) pass on through a separate copper pipe, *c*, to the boilers, where they are utilized for the generation of steam. In less than 24 hours each charge of wood is carbonized, and the cars, with contents, are removed to the first set of coolers, C—similar in size and shape to the retorts, but made of lighter material—by opening the upper end doors of the retorts and moving the cars forward by means of a mechanical rope drive. Here the charcoal is allowed to remain during the time required to carbonize another charge of wood in the retorts, after which it is again moved forward to the second set of coolers, D, where it remains another 24 hours, after which time it is sufficiently cooled and ready for the blast furnace. The coal, still on the same car in which it entered the retort as wood, is now taken by a locomotive to the furnace, or up an incline to an elevated platform where it is dumped into railway box cars if intended for shipment. The process thus is continuous, so that immediately a retort or cooler is emptied it is again filled with another set of cars loaded with wood or charcoal, as the case may be.

The advantage of this system over other retort systems in use lies in the large units adopted and the small amount of labor required in the handling of the material, no manual labor being required after the cars

have been loaded with wood until the charcoal is ready to be emptied. As compared with the kiln system, the very nature of the process of carbonization with internally applied fuel prevents the full recovery of the by-products. While in making charcoal in closed vessels the heat required can all be furnished by burning any kind of cheap fuel, and the full recovery of the by-products is only a matter of a judicious application of the same, the heat necessary to carry on the carbonization in the ordinary brick kilns is furnished to a certain extent by the combustion of part of the wood composing the charge and also (principally during the course of the carbonization proper) of some of the most valuable volatile constituents of the wood containing the very products sought for—namely, the wood alcohol, acetic acid and the tarry compounds. The result is that from the retort system a much larger yield of by-products is obtained, as well as a larger return of charcoal. This is also shown in the following table, presenting some general averages of results obtained on a large scale in carbonizing wood by the different methods common in America, and from wood usually here used for blast furnace purposes:

	Charcoal. Bushels.	Wood alcohol. Gallons.	Gray acetate. Pounds.	Spirits turpentine. Gall.	Tar. Gall.	Values per cord wood.
In meilers, "coaling under dust".....	33 to 35	Nil.	Nil.	Nil.	Nil.	$2.04
In kilns, without recovery of by-products	43 to 45	Nil.	Nil.	Nil.	Nil.	2.64
In kilns, with recovery of by-products.						
In kilns, with mixed hard wood.....	43 to 45	2 to 2.5	50 to 100	..	3	4.04
In kilns, with Southern pine.....	43 to 45	1	50 to 75	5	5	4.98
In retorts, with mixed hard wood	50 to 52	8 to 12	150 to 200	..	5	7.65
In retorts, with Southern pine...	50 to 52	1.5 to 2	120	10	10	7.37

In the column of values the following prices have been used:

	Cents.
Charcoal, per bushel of 20 pounds.....	6
Wood alcohol, "crude," 82 per cent., per gallon (Am.).....	30
Acetate of lime, "gray acetate," 80 per cent., per 100 pounds	90
Tar, per gallon.....	2
Spirits turpentine, per gallon of 7 pounds.....	25

The general arrangement of the Algoma Steel Company's by-product plant is in many respects unique. The unit adopted is also considerably larger than that which has been attempted at any other plant of its kind, and the economy in steam and labor resulting from these innovations has proved the advantages of the same. For this reason we present a general sketch, Fig. 2, and a description of this plant.

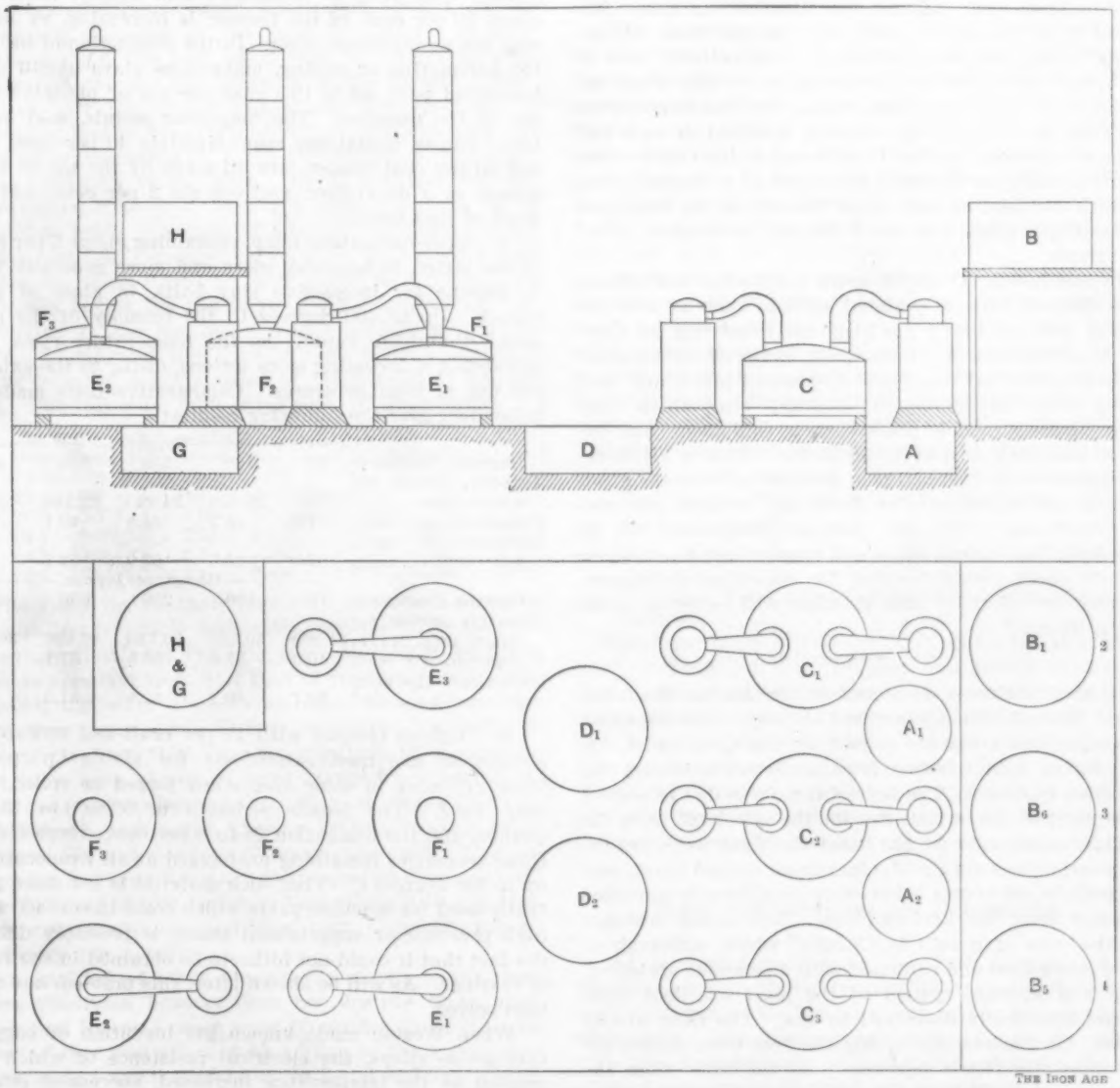


Fig. 2.—Elevation and Plan of By-Product Plant of Algoma Steel Company, Sault Ste. Marie, Ont.

The liquor from the retort condenser, *a*, Fig. 1, runs by gravity from trough *b* to an underground wooden pipe, discharging into the lower tanks, A, Fig. 2, from which it is pumped to raw liquid tanks B_1, B_2, B_3, where the tar has an opportunity to settle and separate. From the bottom of B_1 and B_2 the liquor runs to the tar stills C_1, where the acid is separated from the alcohol; and from the middle of tanks B_2 and B_3 the clear liquor is run off to raw liquor stills C_2 and C_3, to be freed from tar. The distillate from these stills runs to neutralizing tanks D_1 and D_2, where it is mixed with dry slaked lime, which with the acetic acid forms acetate of lime. This, to-

gether with the liquor, is forced to lime lee stills E_1, E_2 and E_3, where the alcohol is distilled off (8 to 10 per cent. strong). This weak alcohol is now run to storage tank G, thence to alcohol still F, which takes off the alcohol at an average strength of 82 per cent. (crude); thence to the storage tank H and barrel room, which latter in this plant is in a separate building. The residue from the lime lee still, containing the lime acetate and water in solution, is pumped back to the retort building, where it is evaporated in double bottom steam pans and finally dried on the drying floor L, Fig. 1, above the retorts, thereby utilizing the heat naturally radiating from the same when in operation, and which heat else would be wasted.

The steam required for this plant (designed to treat the by-products from 300 cords of wood per day) is generated in a 1500 horse-power boiler plant. The fuel used is bituminous coal, besides the illuminating gases furnished from the retort plant and the tar from the by-product plant, whereas mill refuse is principally used at the retort plant for the carbonization of the wood, although coal can be used also here. For the handling of this fuel there is a chain elevator installed at each end of the retorts, and the fuel is delivered to the Dutch ovens from the conveyor trough *i* by means of a hinged spout, *o*, which is raised up and out of the way of the wood and charcoal cars when these are being put in or taken out of the retorts.

In conclusion, I would again emphasize the advantages derived from a charcoal system such as now described, and say that I am fully convinced that no charcoal blast furnace is economically equipped or complete without a charcoal retort and by-product plant, and that during times of depression or sharp competition only those furnaces which possess such equipment can expect to hold their own in the battle for existence. It therefore behooves the charcoal iron workers to be on the alert, for (as the editor of *The Iron Age* pointed out several years ago), "if the charcoal furnacemen sit in the ashes of their dead hopes and merely look disconsolate at their silent plants, waiting for something to happen, the recovery of their past prestige will never be more than a dream."

Edward Atkinson, president of the Boston Manufacturers' Mutual Fire Insurance Company, calls attention to two serious accidents caused by the drawing of the fires during cold weather from underneath boilers for inspection purposes. The first of these was due to neglect on the part of the owners to shut the water off from the sprinkler equipment at the time the fires were drawn. The weather was very cold, pipes froze up and burst, and the goods in the rooms below were considerably damaged by water from the broken pipes. The second instance was the case of a mill in Canada, which, although of good construction and equipped with a complete sprinkler pump and hydrant system of the most excellent type, was yet practically destroyed by fire. The facts are as follows: On Christmas morning the fires were drawn for inspection and repair purposes. At the same time the water was shut off from the sprinkler equipment to prevent the same from freezing up. The work of inspection and repairs not being completed at noon, the employees went home, leaving the mill without care. In the afternoon the mill was discovered to be on fire and the two upper stories were completely destroyed. In this case no benefits were derived from the sprinkler service or the fire pump. Both of the cases noted illustrate the need of always keeping fire on at least one boiler, where there is more than one, in case of inspection. Where there is only one boiler, care should be taken that the inspection be made, if possible, only in the summer time, so that the water may be allowed to stand on the sprinkler equipment.

At a meeting of the Trustees of Columbia University, New York, held on January 4, 1904, it was voted to fix the annual fee for tuition in the Schools of Applied Science at $250 from and after July 1, 1904. The annual tuition fee in the schools is at present $200.

Some New Manganese Bronzes.

Magnetic Alloys of Unmagnetic Metals.

An abstract of a paper on the above subject, read recently before the Verein zur Befoerderung des Gewerbfleisses of Berlin by Dr. Heusler of the Isabella Works at Dillenburg, Germany, will probably be of some interest to readers of *The Iron Age*.

The addition of phosphorus to molten copper for the purpose of removing the inevitable cuprous oxide has the disadvantage that, if a slight excess is used (and it is practically impossible to determine the exact quantity needed in each case), the alloy shows a loss of elongation and may become brittle. For this reason, in the manufacture of bronze for castings, the use, as a deoxidizing agent, of an alloy of manganese and copper, containing about 30 per cent. of the former, is increasing, as an excess has no injurious effect. In the production of bronzes for hammering or rolling, manganese plays a still more important part, as in this case the use of phosphorus is out of the question. The numerous metals, sold under fancy names, containing approximately 40 per cent. zinc and 60 per cent. copper, are all made by the use of manganese as a deoxidizer, and contain 2 per cent. and upward of that metal.

A copper-manganese alloy, containing about 5 per cent. of the latter, is becoming more and more generally used in Europe for locomotive stay bolts, in place of pure copper. Up to 400 degrees C. the tenacity of the pure metal diminishes rapidly as the temperature rises, and this defect is becoming more serious, owing to the extending use of high pressures. Comparative tests made at Dillenburg give the following results:

	Copper.				
Degrees Centigrade.	15	100	200	300	400
Tenacity, pounds per square inch	33,700	29,870	24,890	22,330	13,800
Elongation, per cent.	41.6	45.2	44.8	40.1	28.4
Reduction of area, per cent.	67.0	68.5	69.0	52.7	30.0
	Manganese bronze.				
Degrees Centigrade.	15	100	200	300	400
Tenacity, pounds per square inch	51,060	50,630	50,780	47,650	36,840
Elongation, per cent.	40.0	32.4	36.5	37.1	23.7
Reduction of area, per cent.	72.7	60.2	52.4	51.9	...

In England bronzes with 12 per cent. and upward of manganese are used extensively for similar purposes. They are gray in color and, when forged or rolled, are very hard. The tensile strength is 56,890 to 73,960 pounds, and the elongation 28 to 8 per cent., respectively, these properties remaining unchanged at all temperatures up to 350 degrees C. That such material is not more generally used for machine parts which come in contact with high pressure or superheated steam is probably due to the fact that it could not hitherto be obtained in the form of castings. As will be shown later, this problem has now been solved.

When Weston made known his invention of coppermanagnese alloys, the electrical resistence of which decreased as the temperature increased, successful efforts were made in Germany to produce an alloy with a temperature coefficient = 0. This material, a manganese-nickel-copper alloy, has been manufactured at Dillenburg and sold under the name of Manganine for the last 15 years. It has a specific resistance of about 43 microhms, a temperature coefficient = + 0.00001, and on extremely small thermo-electric power as compared with copper. It is principally due to the latter property that Manganine has become a standard material in the manufacture of electrical resistances and measuring instruments, as other alloys have been discovered with low temperature coefficients, but all have high thermo-electric power. Thanks to the process discovered by the German Imperial Testing Institute, of artificially ageing the finished coils by heating them to about 140 degrees C., the properties of this metal remain constant indefinitely.

Dr. Heusler next turns to a consideration of the peculiar magnetic properties of a group of manganese alloys discovered by him recently. Metallic manganese, ferro manganese, and even Hadfield's manganese steel (12 per

cent. manganese), are nonmagnetic, and the same is true of the above mentioned bronzes and Manganine. Heusler by chance discovered that a certain alloy of zinc and manganese showed magnetic properties, as did also a solution of this alloy in an equal weight of copper, the same result being obtained by alloying the commercial manganese-copper with zinc. Experimenting along these lines, an addition of aluminum to manganese-copper was found to produce an alloy still more strongly magnetic than the first. Experiments with other trial metals showed that those of the arsenic group, not excepting the diamagnetic bismuth, form magnetic alloys with manganese or manganese copper.

A very extended series of magnetic measurements was made to determine the laws governing these phenomena, and the most important results are here considered. Manganese-aluminum-copper alloys had proved, in the qualitative experiments, the most susceptible to magnetization, and the first effort was to determine what composition showed this property in the highest degree. Starting with the 30 per cent. manganese-copper of the Dillenburg Works, the susceptibility to magnetization was found to be dependent on, 1, the percentage of aluminum; 2, the condition of the alloy. Great difficulty was encountered on account of the alloys, especially those low in aluminum, being in a state of unstable equilibrium when freshly cast. In consequence, the first tests gave irregular results, from which no laws could be deduced. By artificially ageing the test pieces, stable equilibrium, corresponding to the maximum magnetization, was established. This ageing was done by keeping each sample in boiling toluol at a temperature of 110 degrees C. for two days. The following table gives some of the results:

Cast No.	Analysis. Man-ganese.	Alumi-num.	Atomic relation Man-ganese.	Alumi-num.	Field intensity. 20	40	100	150
34	28.1	3.6	3	: 0.8	Not magnetic.			
35	27.7	5.7	3	: 1.25	Slightly magnetic.			
36	25.9	9.6	3	: 2.25	2,220	2,670	3,200	3,470
32	26.5	14.6	3	: 3.2	4,500	4,850	5,380	5,550
33	24.4	13.8	3	: 3.4	3,580	4,075	4,645	4,900

The above results show that with constant manganese contents the magnetic properties increase with the percentage of aluminum, reaching their maximum when the latter is approximately half that of the manganese—that is, when the alloy contains an atom of aluminum for exact atom manganese. This is especially interesting in view of the fact that aqueous solutions of manganese salts have been shown to have magnetic properties as strong as, or even stronger than, those of iron. There is, therefore, an unexpected analogy between certain manganese alloys and solutions of manganese salts. This explains the fact that the magnetic properties decrease with the percentage of that metal, so that alloys with less than 10 per cent. manganese and 5 per cent. aluminum are all practically unmagnetic.

An addition of other unmagnetic metals to the manganese-aluminum bronzes does not destroy these properties, and in some cases even intensifies them. An instance of this was afforded by adding to the manganese-copper alloy a small amount of lead, and sufficient aluminum to make one atom to each atom manganese. The following table shows that Cast P 10 in a strong field has about two-thirds of the magnetic properties of cast iron, but in a weak one it equals and even exceeds the same:

Cast No.	Analysis. Manganese	Field intensity = 20	Field intensity = 40	Field intensity = 100	Field intensity = 150
P 10	24.1	4,800	5,500	6,050	6,480
M 8	20.7	3,050	3,550	4,200	4,600
P 6	16.1	650	950	1,400	1,800

The introduction of lead lowers considerably the point above which these bronzes are no longer magnetic. With iron this point is about 800 degrees C.; with nickel, 400 degrees C.; with the manganese-aluminum bronzes, free from lead, these points generally rise with the percentage of manganese, and if the latter is constant, with the aluminum contents.

Cast 32 could still be magnetized at 310 degrees C., while an alloy containing 16 per cent. manganese, 8 per cent. aluminum and 76 per cent. copper was not magnetic above 160 degrees C. Impurities are, however, of influence in this respect, as another bronze with the same quantity of manganese and aluminum lost its magnetic properties at 60 to 70 degrees C.; on cooling these properties reappear.

Regarding the practical value of magnetic bronzes, it is suggested that this loss of magnetism at a comparatively low temperature might be utilized in fire alarm apparatus. Their low electrical conductivity and relatively small hysteresis would seem to favor using them largely for electrical apparatus, but, unfortunately, those alloys which have the relatively high induction of about 4000 C. G. S. units are so hard and brittle that their use is impractical. The low manganese alloys can, however, be sufficiently easily worked to allow of their use when low induction is sufficient. Should it prove feasible to make them in the form of bronze powders, some important progress could be made in the industries using this class of material.

The investigations described above enabled Heusler to solve the problem mentioned in the early part of his paper—namely, to make a casting bronze which at temperatures up to 300 degrees C. does not diminish in tensile strength. He noticed that a peculiar effect is produced when aluminum is added to manganese-copper until the percentage is half that of the manganese. The previously mentioned alloy, containing 16 per cent. manganese and 8 per cent. aluminum, is strikingly close grained, and, although hard, can be worked easily.

By successively reducing the manganese and aluminum proportionately, the alloys become gradually softer and more malleable. They can be cast easily and have a solid, homogeneous fracture, very different from that of bronzes, which only contain a small amount of aluminum in conjunction with manganese. The latter can only be cast with difficulty, and are deficient in tensile strength. The manganese-aluminum bronzes show the same tensile strength at 300 degrees C. as at ordinary temperatures. A bronze made at Dillenburg for stuffing boxes and similar castings showed:

At 15 degrees, 36,980 pounds per square inch, with 9 per cent. elongation.

At 300 degrees, 36,550 pounds per square inch, with 14 per cent. elongation.

The importance of this result is seen when it is taken into consideration that ordinary cast bronze at 300 degres C. shows only a fraction of its strength at ordinary temperature, and should therefore never be used in contact with superheated steam. For all parts subject to high temperatures manganese bronze should be specified. Where rolled material can be used, it should be given the preference; where castings are necessary, the new manganese-aluminum bronze will fill all requirements.

Two Deliverances on Reciprocity.

At its annual meeting in New York City on January 21, the American Protective Tariff League reaffirmed the position taken by the league a year ago on the question of reciprocity. The league unanimously adopted an address "To the Protectionists of the United States," the concluding paragraphs of which are as follows:

Reciprocity in competitive products is unsound in principle, pernicious in practice and condemned by experience. It is contrary alike to the national policy of protection, to the fair treatment of domestic producers, and to friendly relations with foreign countries.

It is neither ethical nor economic, since it seeks to benefit some industries by the sacrifice of others. Reciprocity in competitive products is the policy of favoritism. It tends to array industry against industry, section against section, at home, and to foment commercial retaliation and political antagonism abroad. True American policy is protection of all the opportunities and possibilities of the American market for American enterprises; and fair, equal trade treatment for all other countries.

The meeting was the nineteenth annual and was held at the headquarters of the organization, 339 Broadway.

The general operations of the league were presented by the treasurer and general secretary, and showed that the total receipts of the organization for the year had been $38,246.53 and disbursements $37,320.11, leaving a balance on hand of $926.42. Total membership in the organization 878, located in 22 different States. Twenty-eight new memberships were received during the year.

and the total distribution of tariff literature during the year amounted to nearly 17,000,000 pages of printed matter.

The election of officers to serve for a period of one year resulted as follows: Charles A. Moore, president; A. G. Paine, first vice-president; Joseph E. Thropp, second vice-president; Wilbur F. Wakeman, treasurer and general secretary.

The election of members of the Board of Managers showed several changes. William F. Draper of Massachusetts was elected to succeed E. A. Hartshorn of New York; F. W. Cheney of Connecticut, to succeed George M. Landers of Connecticut; D. M. Ferry of Michigan, to succeed Francis E. Warren, United States Senator, of Wyoming, and A. J. Cordier of New York, to succeed F. S. Witherbee of New York. The following were elected to succeed themselves for a period of four years: A. D. Juilliard and Theo. M. Ives of New York and Jos. E. Thropp of Pennsylvania. The following were elected as members of the Executive Committee to serve for a period of one year: William Barbour of New Jersey, chairman; Frank W. Cheney of Connecticut, Franklin Murphy of New Jersey, David L. Einstein of New York and William F. Draper of Massachusetts.

At Washington, D. C., on the same day, the following resolution was unanimously adopted by the National Board of Trade:

That the National Board of Trade favors the establishment and maintenance of judicious reciprocal commercial relations with the chief foreign markets of the world, and especially with the Dominion of Canada and other contiguous countries.

Reports from Salt Lake City, Utah, state that a large and well defined ledge carrying a high percentage of tin has been found 3 miles west of Salmon City, Idaho.

The Mietz & Weiss Two-Cylinder Marine Kerosene Engine.

Some time since there was described in *The Iron Age* the stationary engine and the portable electric lighting plant made by August Mietz, 128-138 Mott street, New York. As the result of inquiries for a marine engine of the same type there has recently been developed the machine which we illustrate at the present time. The desirability of using in an internal combustion motor the safe oils, such as kerosene, the distillates and various grades of fuel oil, as was satisfactorily accomplished in connection with the Mietz & Weiss stationary engine, is of perhaps even greater importance in the propulsion of small craft, from the 12-foot pleasure boat to the family or party launch of from 50 to 100 feet in length. It is claimed by the makers that the difficulties which have attended the use of the heavier oils for motive power, either ashore or afloat, have been overcome in the Mietz & Weiss engine, and that its possibilities promise to open for it a field for wide introduction.

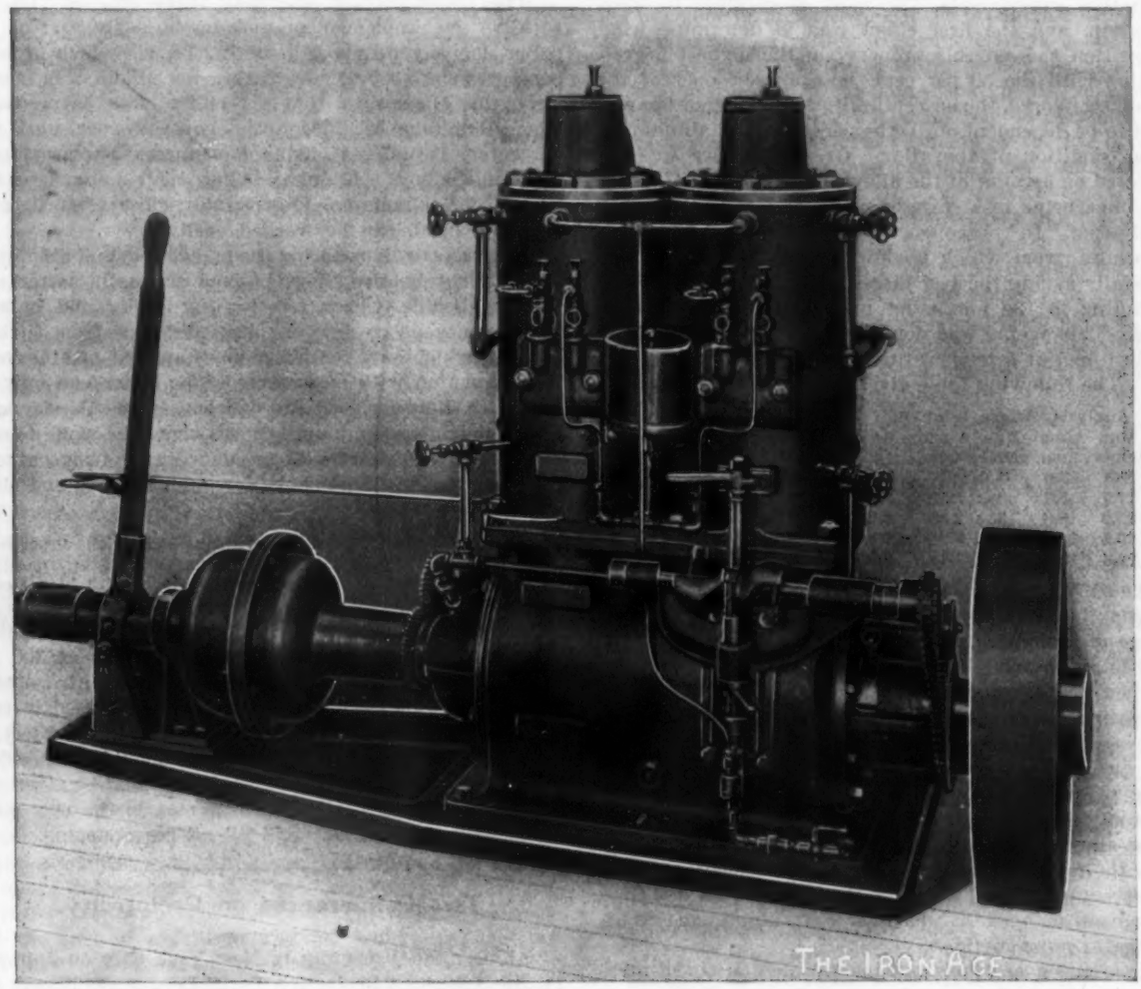


Fig. 1.—Front or Starboard Side, Showing Governor, Oil Pump and General Mechanism.

THE MIETZ & WEISS TWO-CYLINDER MARINE KEROSENE ENGINE.

Figs. 1 and 2 show respectively starboard and port side views of the engine, the propeller being omitted from Fig. 1 so as to show the mechanism of the machine to a larger scale and with correspondingly greater clearness. The engine illustrated is the 15 horse-power size, having cylinders 6 inches in diameter, a stroke of 6½ inches, and designed to run at a speed of 500 revolutions per minute. In the port side or front view of Fig. 1 are shown the governor, the oil pump and the oil distributing system. The peculiarity of the oil feeding system, which is adapted to engines of any number of cylinders, is based upon the principle of injecting the oil into the compression spaces from a single pump, the distribution and

timing of the injections being in accord with the differences in pressure existing at the moment of the injection stroke of the pump. The great advantage of this arrangement lies not alone in its simplicity, but also in its equal proportioning of the quantity of oil delivered to each cylinder under varying loads.

The governor is of the centrifugal type and is stated to be unaffected by the rolling of the boat. It consists of a rotating centrally pivoted weight, carrying an eccentric which operates the pump plunger once for each cylinder. The oil consumption is said to be slightly more than one pint per brake horse power per hour. The cranks are opposite to each other, thus giving two impulses for each turn of the shaft. The lubricating system is the same as in the stationary engines built by the same makers, the oil being fed by suction from a single reservoir placed below the point of feed. The main bearings of the engine are not lubricated from this system, but are of a special ring oiling type. The thrust of the propeller is taken up by a ball bearing placed between the reversing clutch and the after main bearing of the engine.

The reversing gear is of an entirely new design. A section is shown in Fig. 3, the parts being viewed from the port or rear side, as in Fig. 2. The propeller shaft proper terminates at the coupling shown at the extreme left of Fig 1 and just to the right of the reversing lever in Fig. 2. From this coupling a short reversing shaft extends into the reversing clutch, as plainly shown in Fig. 3. Embracing this reversing shaft and forming its principal bearing is a brass sleeve passing through a bracket upon the reverse lever fulcrum plate and rigidly secured thereto, so as always to remain quiet, without rotating. Rigidly fixed to the forward or left hand end of the shaft is the coned friction driving disk by means of which the propeller is always turned. The after end of the crank shaft extends through the ball bearing a sufficient distance to receive the hub of the forward half of the reversing clutch case. Ftited to this forward half by male and female flange connection is the rear portion of the case, its hub having a bearing upon the fixed central sleeve embracing the reversing shaft. This case complete rotates continuously with the engine. The interior of each half is turned conical in form. The short reversing shaft is allowed a slight axial movement fore and aft—that is, to the left or right in Fig. 3—and may throw the main driving disk attached to the end of the reversing shaft into driving contact with the forward half of the casing. The propeller is then driven in the same direction as the engine from the forward half of the case through the driving plate to the reversing shaft, and thence to the propeller shaft. This direct driving gives the forward movement to the boat. The forward movement of the reverse lever to give this direction or motion is therefore entirely logical.

For motion astern the reverse lever is thrown to the right of Fig. 3, so as to reverse the motion of the propeller, while that of the engine remains as before. Mounted upon studs screwed into the fixed sleeve nearly centrally within the reversing gear case are bevel pinions, meshing with corresponding bevel gear teeth cut upon the backs of the driving cones shown at either side of the pinions in Fig. 3. The gears run loose upon the sleeve and, being always in mesh with the beveled pinions, must necessarily rotate in opposite directions when turning at all relatively to the sleeve upon which they are mounted. Movement of the reverse lever to the right withdraws the main driving plate from contact with the forward half of the casing and brings its interior conical surface into contact with the exterior of the left hand of the two reverse motion cone gears, and at the same time forces the right hand of these gear cones into contact with the conical interior surface of the after or right hand half of the case. The sleeve, as well as the reversing shaft, is allowed a slight movement fore and aft to accommodate this motion. In this case the driving of the propeller in the direction opposite to that of the engine is plainly accomplished from the rear half of the casing to the

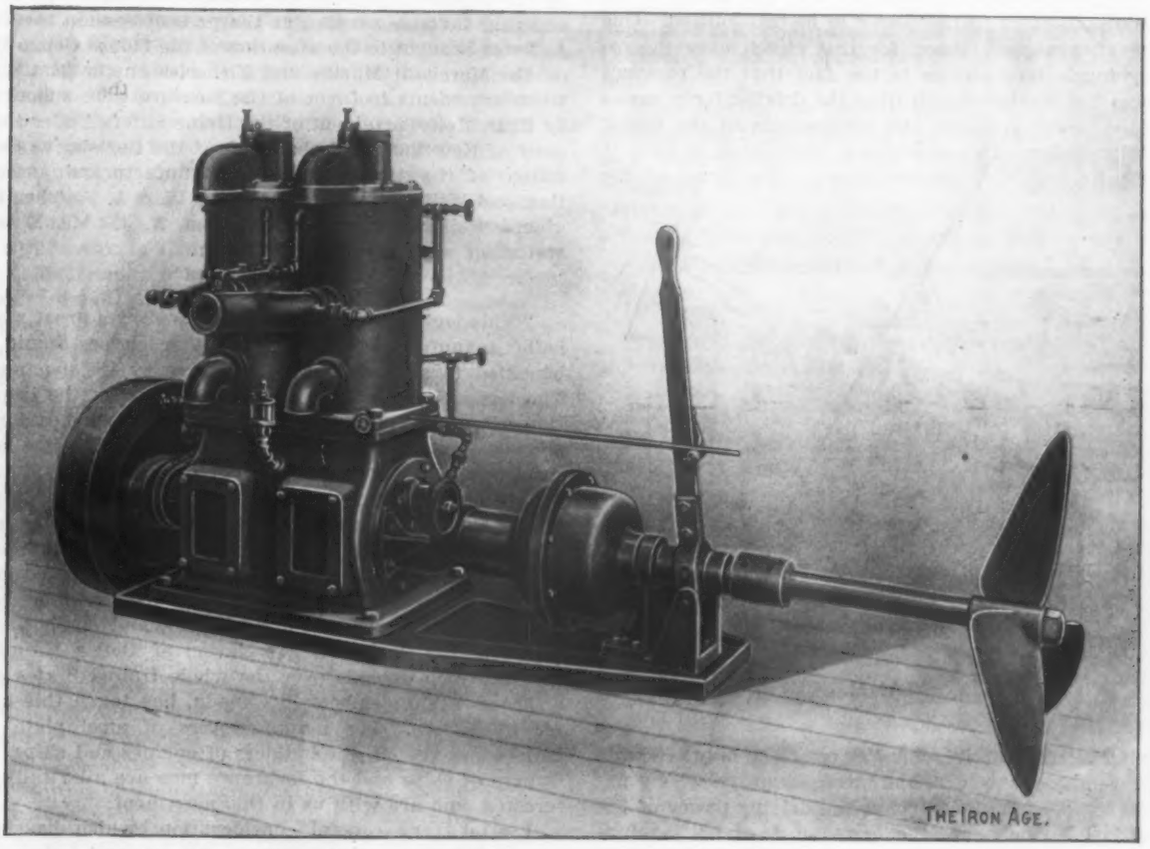


Fig. 2.—Rear or Port Side, Including Propeller Wheel.

THE MIETZ & WEISS TWO-CYLINDER MARINE KEROSENE ENGINE.

right hand geared cone, thence to the reverse motion cone through the bevel pinions, and finally to the main driving disk, as before. As indicated in Fig. 3, the thrust collar with which the reverse lever engages to give the fore and aft movement of the reversing shaft is fitted with ball bearings.

It should be noted that the thrust of the propeller in forward motion exerts its entire force directly against the frictions so as to keep them in driving contact without the assistance of toggle levers or cams, the whole connection from engine to propeller acting as one solid shaft. On the other hand, when the propeller is reversed its tension upon the shaft exerts its force to hold the reversing gearing into driving contact in the desired direction. A central position of the reversing lever disengages the shaft entirely, so that the engine may continue to run idle while the propeller remains at rest. The case or drum enclosing the reversing mechanism is quite tight. The friction surfaces are metallic and are stated to be large in proportion to the power to be transmitted. One of the advantages claimed for this clutch over the ordinary toggle lever device is the fact that the pressure creating the friction constituting the driving force varies with the power required and corresponds to the thrust of the propeller. In consequence, the clutch is said to pick up its load very gradually, since the thrust of the

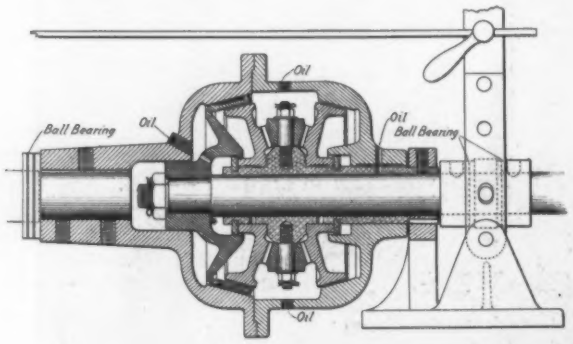


Fig. 3.—Section through Reversing Clutch.

THE MIETZ & WEISS MARINE ENGINE.

propeller against the friction disk comes on only after the wheel commences to turn, and increases progressively until full speed is obtained. Thus the driving power of the clutch is independent of the operator or of his manipulation of the reversing lever. This feature, it is believed, will be appreciated by owners of boats wherein a sudden reversing or throwing in of the clutch produces an unpleasant, jerky motion.

It may also be noted that the friction clutch mechanism as a whole is extremely small and compact, as compared to the power which it transmits. It is stated that the clutches used with various sizes of these engines have in all cases a driving capacity fully twice the rated power of the engines. The value of so generous a power rating for the reversing gear will be appreciated by all familiar with the service required of such mechanism and the abuses which it must often endure. The friction disk for the clutch used on a 15 horse-power engine, which is the size shown in Figs. 1 and 2, is 9 inches in diameter. The shaft diameter is 2¼ inches. It should be noted that the base plate of the engine is extended to afford a rigid support to the reversing mechanism; thus perfect alignment of all parts is readily secured and maintained.

De Fries & Co., Akt. Ges., of Duesseldorf, announce that Heinrich de Fries has withdrawn. Alf. H. Klinkmann becomes a partner and the manager of the Italian branch, de Fries & Co., Milan. A. Roeper is the sole director of the company, Carl Kratz and Franz Jansen signing. Robert Teegler has been appointed manager of the works at Heerdt and signs. Heinrich de Fries has formed the Heinrich de Fries G. M. C. H. at Duesseldorf to handle the "Stella" line of hoists, manufactured for years by the firm of de Fries & Co.

Revised Boiler Regulations Desired.

Manufacturers Urge Appointment of Expert Commission.

WASHINGTON, D. C., January 26, 1904.—The boiler manufacturers have determined to make a vigorous effort to secure the passage of the bill authorizing the creation of a commission to revise the laws relating to the construction, installation and inspection of marine boilers. This bill was originally drafted by the American Boiler Manufacturers' Association and was introduced in the last Congress, but owing to the lateness of the session was not passed by either house, although favorably reported by the Senate Committee on Commerce. With a view to securing favorable action at the present session the subject was brought to the attention of the House Committee on the Merchant Marine and Fisheries on the 21st inst., when arguments in favor of the measure were submitted by E. D. Meier, president of the Heine Safety Boiler Company of New York and chairman of the Legislative Committee of the American Boiler Manufacturers' Association, and William H. Fletcher of the W. & A. Fletcher Engine & Boiler Company of Hoboken, N. J. Mr. Meier's statement was, in part, as follows:

Mr. Meier's Argument.

"This legislation is earnestly desired by a great many boiler manufacturers, but many other classes would be benefited to a most important degree by its enactment. The legislation which bears on the subject of the inspection of vessels, and especially of boilers and steam machinery, is very antiquated. A great many of the laws were passed 25 and even 30 years ago, and they do not fit present conditions. To-day we are carrying much higher steam pressures on land as well as on water, and entirely new devices, new designs and new machinery are in use, so that the operation of these antiquated laws has become very irksome. These considerations bear chiefly on the construction of boilers and engines, and therefore the American Association of Boiler Manufacturers, which extends over the whole United States and embraces some members in Canada, has taken this matter up. . . . The manufacturers of steel plate for boilers and vessels, the builders of engines and ships, the owners of ships and the insurance men are all vitally interested, and are with us in this movement.

"After very careful consideration, which has now extended over a period of two years, we come before you to state our conviction that there is no way of properly adjusting this matter except by appointing a special commission to hear the views of all who are interested and to harmonize them in the form of a mutually satisfactory measure. There are at least seven definite interests that we could mention, all of which will be heard by the commission, and we do not hesitate to say that the decision that might be reached by an expert commission on any technical point will be satisfactory to all concerned.

"The methods which prevail under the present law are causing greater hardship each year. The Board of Supervising Inspectors meet once a year in Washington. Any one who has felt the burden of some ill considered rule can come before them, and if he can make a good demonstration of his point the inspectors will usually pass a rule for his relief. Now, some of the men who compose the Board of Supervising Inspectors have knowledge of hulls, some are old steamboat captains, but generally very few of them are engineers or experts in boilers. The result is that it frequently happens that regulations adopted at the January meeting of the board, while relieving certain interests, impose hardships on others, but after the meeting has adjourned there is no redress for a whole year, and the situation is therefore most unsatisfactory to all concerned. I have found the inspectors willing to take a reasonable view of all questions, but they are hampered by the law and by their

system, and they have no authority to make such a comprehensive revision of the regulations as would be satisfactory to all interests, even if they possessed the necessary technical skill.

Important to Foreign Trade.

"The laws and regulations governing the manufacture and inspection of boilers are of the most importance to American vessels engaged in the foreign trade, and if we are to have our flag on all seas, as we hope to have it, our methods of inspection must compare favorably with those of the great maritime nations; otherwise the owners of American vessels will find that they cannot secure charters in the leading ports of the world. We hope that this commission will include representatives of the commercial, manufacturing, maritime and military interests. The technical questions concerning the manufacture of plate, rivets, boilers, engines and the construction of ships should be understood in a technical sense by one or more members of the commission, but it is of the highest importance that the navy and revenue marine service should be represented on the commission, for in case of a foreign war we must look to the merchant marine for auxiliary cruisers and they must always be constructed and fitted out in such a manner that they can be used with little or no change, so that a naval officer going abroad will be accustomed to conditions which he finds prevailing on these vessels, especially with reference to their motive power.

"Aside from the beneficial effect of the work of an expert commission in revising these laws relating to marine boilers, an important advantage would accrue to steam users throughout the country. We already have ample evidence of this in the fact that since the rules for the manufacture and inspection of boilers were first adopted in this country, 40 years ago, the cities and towns along the navigable waters have adopted ordinances based on these rules and steam users in all parts of the country are to a very great extent controlled by local regulations based more or less upon the Federal laws. If the Government through an expert commission would consider this subject carefully and frame an up to date statute, the whole country would quickly follow and the plans, specifications and regulations of the Federal Government would be in use everywhere."

Representative Minor of Wisconsin, a leading member of the committee, who was formerly an engineer and ship owner, suggested to Mr. Meier that the proposed bill be so enlarged as to cover methods of ship construction as well as boiler manufacture. Mr. Meier said he saw no objection to it except that it would be more difficult to assemble an expert commission on such a broad basis. Mr. Minor gave the committee the benefit of his own experience on the Great Lakes, where he said a shipmaster dare not go beyond the district line with an inspector's license for fear that he would fall under the observation of another inspector, who would revoke his license because of a difference in the construction placed by the several inspectors upon the same regulations. Some districts on the lakes require copper where others permit iron, and the master of a vessel with an iron steam pipe dare not let his vessel go outside of the district in which it is licensed for fear some other inspector may require copper.

Diversity in Rulings.

Mr. Meier endorsed Mr. Minor's statement and gave a number of additional illustrations showing the diversity in rulings by the several inspectors. In this connection he said:

"Some time ago there was a ruling in regard to steam pipes and steam connections, the rule being so drawn that the construction was actually larger than the boiler, and thus what was intended to be an element of safety was an element of danger. Not long ago a first-class boiler manufacturer, whose name stands high in the trade, built a boiler in Buffalo. It was inspected and pronounced in every way up to the highest standard; but the local inspector in the Alaska district, who was far from being an expert, would not pass it. It frequently happens that a blue print is rejected in one district after having been accepted in another. Not long ago a boiler plate tested and stamped by the inspector in the Pittsburgh district was sent down to Mobile for a boiler originally built in Pittsburgh, but the local inspector at Mobile would not acept it without a special test made in his own district. Of course with a harmonious set of laws on the subject such an incident could not occur."

Mr. Fletcher followed Mr. Meier, indorsing what he said, and, referring to his own experience, declared that his firm frequently refused to build boilers according to specifications approved by supervising inspectors, for the reason that such boilers would not be safe. He desired it understood that the blame in such a case should not attach to the inspector but to the law, which he felt obliged to follow in spite of his knowledge that it was not appropriate to modern conditions.

At the conclusion of the hearing, Representative Grosvenor said he would introduce the desired bill and, subsequently, on the same day he presented it in the House. Senator Frye, chairman of the Senate Committee on Commerce, also introduced the bill in the Senate on the same day.

After leaving the Capitol, Messrs. Meier and Fletcher called at the Department of Commerce and Labor, where they received assurances that Secretary Cortelyou would co-operate with them in their effort to secure the early revision of the laws relating to boilers, and, pending the action of Congress, would promulgate such revised regulations as existing statutes would permit.

W. L. C.

The daily papers have published sensational articles stating that Sir Archibald W. Maconochie, member of Parliament, and head of the Consolidated Pneumatic Tool Company, the English branch of the Chicago Pneumatic Tool Company, was about to enter suit against Charles M. Schwab, J. W. Duntley and Max Pam, as individuals, to recover $250,000 which Mr. Maconochie paid for stock in the company, on the ground that statements made to him at the time the investment was made were not correct. To this attack the officers of the Chicago Pneumatic Tool Company make reply, representing the following two cablegrams: From Sir Archibald W. Maconochie: "Publication altogether without authority. You have complete answer to such malicious statements in the fact that I am still a director of your company, an English one, and am doing all possible to promote their success." From Fred. Johnson, managing director of the Consolidated Company: "Maconochie is loyal; can be depended upon; is giving all possible assistance to make company complete success. Sensational publications are malicious and false."

The Manufacturers' and Employers' Association of Trenton, N. J., was formed on January 23 by nearly 200 representatives of the varied industries of the city, in response to a call sent out by existing employers' associations representing special lines, all of which will become subordinates in the new central body. Prominent manufacturers actively interested in the new organization include: W. L. Blodgett of the Rubber Manufacturers' Association, Clifton Reeves of the Master Mechanics' Association, Richard Oliphant of the Foundrymen's Association, Clarence Toms of the Master Carpenters' Association, A. K. Leuckel of the Carpenters and Builders' Association, William J. Morris of the Building Masons' Association, Frank P. Ferry of the Master Painters' Association, J. A. Dowling of the Master Plumbers' Association, Clinton Higgins of the Sheet Iron Workers' Association, and a committee representing the Master Potteries Association. Mr. Lueckel was made secretary, and permanent officers will be chosen at the next meeting. It is the purpose of the organization, among other things, to establish a bureau of employment.

The Schonthal Iron & Steel Company, Cumberland, Md., will on February 1 open a general sales and purchasing office at Columbus, Ohio, which will be under the direct management of B. E. Schonthal, who also continues in charge of the main office, at Cumberland.

The Sand-Lime Brick Industry in this Country.

There are now building or have been recently completed in this country several plants for the manufacture of brick from sand and lime, without burning, by a process which has been in successful use in Germany for about 25 years. By this process a brick can be molded one day and put into the wall the next, whereas an ordinary kiln burned brick made from clay requires an interval of from two to four weeks between the time the clay is molded and the brick is ready for use.

By this new process slaked or unslaked lime is thoroughly mixed with sand in proportions of from 5 to 15 per cent., according to the physical formation and chemical ingredients of the sand; the bricks are pressed in hydraulic or toggle joint presses, the material at the time of pressing being almost dry, and after pressing the bricks are loaded onto steel cars which are pushed into a long retort or cylinder. When the cylinder is full the head is bolted into place and live steam is turned on, rising to a pressure of 125 pounds per square inch, and the brick are subjected to this pressure over night. In the morning, when the hardening cylinder is opened, the brick are hard enough to be put to their proper use. When this kind of brick was originally made in the Potsdam district in Germany hardening was accomplished by exposure to the air for several months, but it was found that steam pressure did in a few hours what would require many weeks under the ordinary forces of nature.

The finished brick is, properly speaking, an artificial sandstone, or, technically, hydrosilicate of lime, the lime first acting as a bond between the grains of sand when subjected to pressure and later combining chemically with the silica of the sand.

One of the most interesting plants that is now being operated is known as the Colonial Brick Company at Kokomo, Ind. It is virtually a department of the Pittsburgh Plate Glass Company, and the sand used in the manufacture of the bricks is the waste sand from the polishing mill of the glass works. The capacity of this plant is 20,000 bricks per day. Millions of cubic yards of this sand, the accumulation of years, surround this new brick plant. While problems are met with in the formation of brick from this sand that would not be encountered in any other sand, because of the fluffy, impalpable character of the material, and its admixture with undesirable ingredients during the polishing process, they are being overcome, and the product is a brick of extremely fine grain and exceptional beauty. It is understood to be the purpose of the Pittsburgh Plate Glass Company to install the same system in the balance of their ten mills, thus turning into a profitable commodity a waste product that has been not only a loss, but a burden.

Another interesting plant is that of the Black Hills Pressed Brick Company, at Deadwood, S. D., in which the tailings from the stamp mills of the Homestake gold mines are converted into brick of very great density and strength. This plant has a capacity of 20,000 bricks per day.

The Golden Gate Brick Company of San Francisco, Cal., are building a mill at Antioch, Cal., that will also have a capacity of 20,000 bricks per day.

The Sioux Falls Pressed Brick Company, Sioux Falls, S. D., are putting in a plant of the same capacity.

The Southern Sand-Lime Pressed Brick Company, at Mobile, Ala., are nearing the completion of a plant that will make 20,000 bricks per day from Mexican Gulf sand.

A plant is also arranged for at Lafayette, Ind., and one at East Alton, Ill., is proposed.

The ground plan and elevation of a typical plant are given in Figs. 2 and 3.

In Fig. 1 the sand supply may be said to be in the foreground, with unslaked lime to the left. The lime is slaked in the hardening cylinders, conveyed to the slaked lime bin and from that bin to the pulverizer. Sand previously run through sieves is conveyed to one hopper of a vibrating measuring device, and lime is similarly conveyed to the adjoining hopper. Openings in these hoppers are so spaced that exactly the right proportions of sand and lime fall from the measuring devices into the mixer or pug mill. In this mill the sand and lime are thoroughly disintegrated and mixed, and in a semimoist condition the mixture is conveyed to a hopper immediately over the press. The press used for making the sand-lime brick is not essentially different from other brick presses. The type that has been installed in the above named mills is what is known as the Berg press, built by the Anderson Foundry & Machine Works of Anderson, Ind. The press contains a chamber in its center,

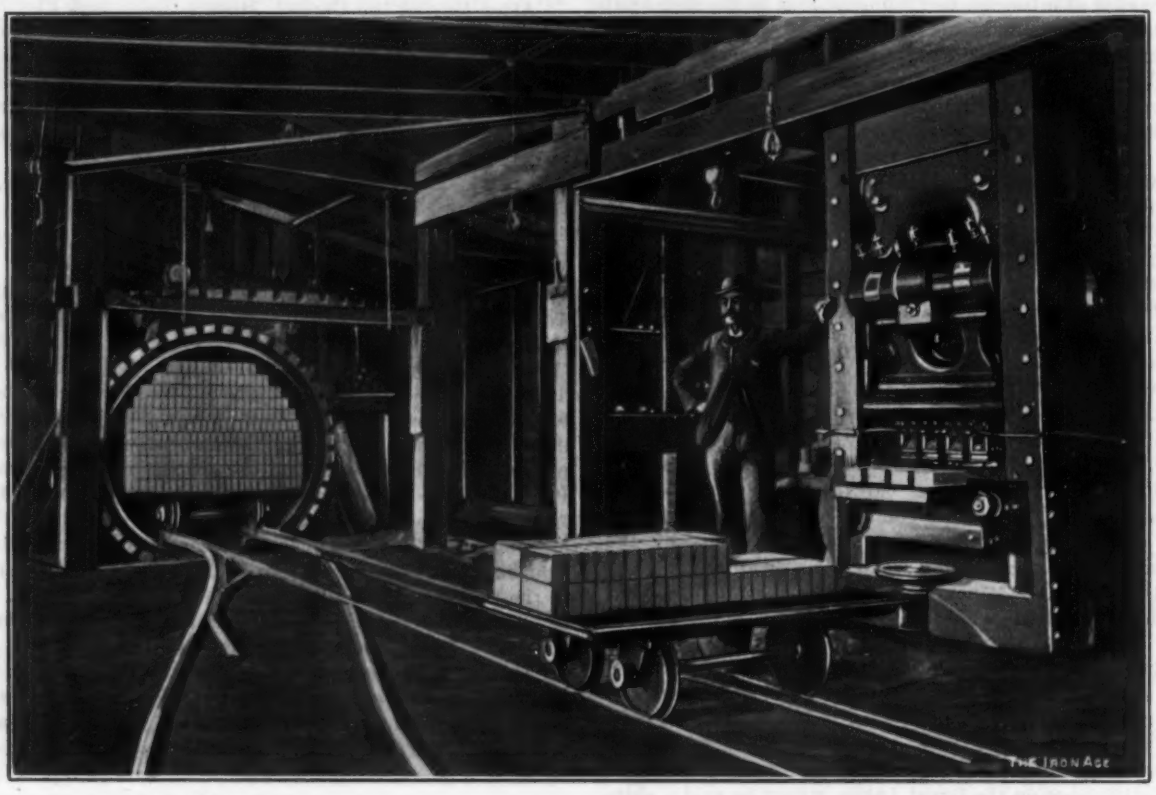


Fig. 1.—Interior View of Plant, Showing Brick Press and the Forward End of the Hardening Cylinder.

into which the sand and lime mixture from the pug mill comes by gravity. Below this receptacle is a passageway, in which a plunger moves back and forth, pushing before it each time the requisite amount of mixture to fill the four molds of the press, and on its return trip smoothing off the tops of the molds. Simultaneously with the retreat of the plunger the toggle joint action of the press forces the vertical plunger downward at a pressure of approximately 300,000 pounds per brick. As this pressure recedes from its maximum, the lower plunger rises and gives the brick a similar squeeze in an upward direction. Another turn of the drive wheel raises the bottom plunger to the level of the table in front of the machine, and when this level is reached the horizontal plunger previously referred to moves forward and shoves the completed brick out onto the table, at the same time filling the molds for the next turn. From this table the bricks are picked off by hand and placed on steel cars that move on a track just back of the operator. These cars are of various forms, the latest type having a receptacle for lime suspended underneath the axle. When

As sharp sand is best for this work and as this is most destructive to the mold the easy replacement of the liners is an important feature of the machine. The quantity of material that is put into the molds is regulated by a screw device which raises or lowers the bottom of the mold. Sands that are spongy and light in their formation have to be compressed to about one-third of the original volume of the sand in the mold, while heavy metalliferous or quartzite sands, like those encountered at the Black Hills plant, will not stand quite 50 per cent. compression.

Machinery for a plant of this kind includes a mill for crushing and grinding lime; conveying appliances, including cars and car pullers, for transferring materials at the various stages of operation; a measuring device which sifts and measures out the lime and sand in their proper proportions; a pug mill or mixer in which the lime and sand are thoroughly mixed; a molding press, hardening cylinder, steam boiler and engine, and a grinding machine for grinding mold liners.

The Elwood Iron Works, Elwood, Ind., owned by

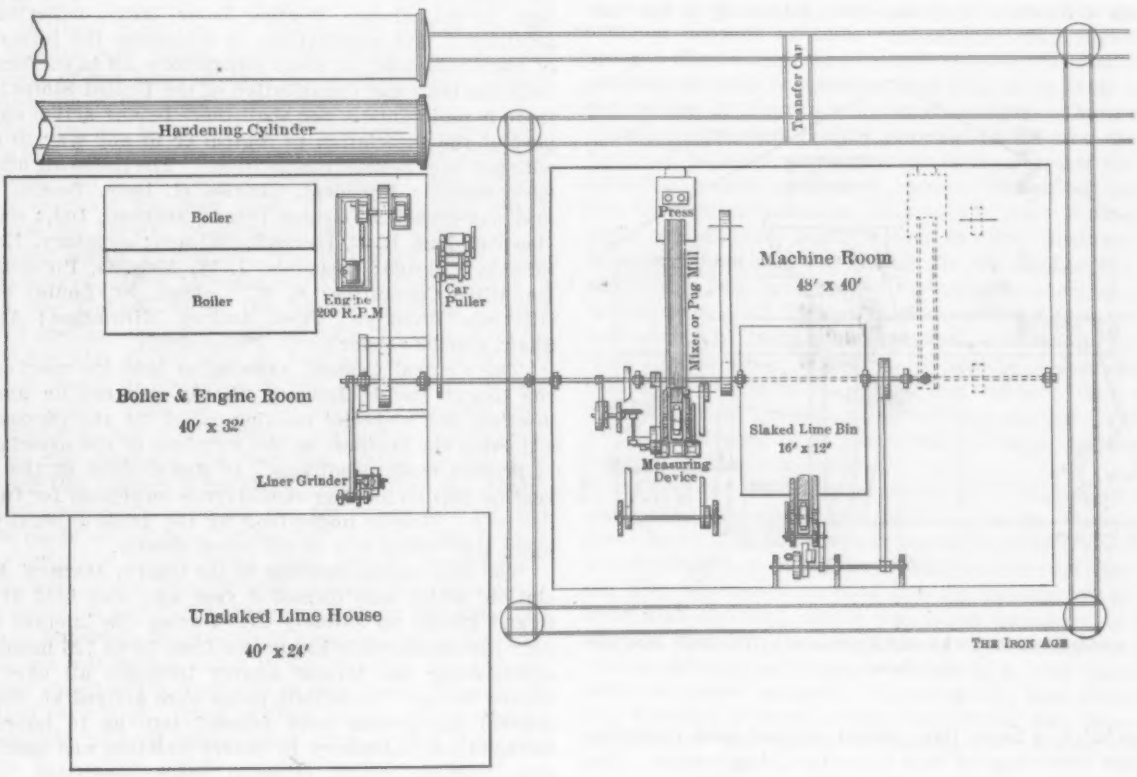


Fig. 2.—Plan Showing Arrangement of a Sand-Lime Brick Plant.

the cars are loaded with the green bricks they are shoved into the hardening cylinder, which is built on the plan of a cylindrical steam boiler, the ones in the plants in question being 66 feet long and 6 feet in diameter, holding 20,000 bricks at a time. When at the close of the day the cylinder is completely loaded, the hinged head or door is closed and bolted into place and steam from the boiler is turned on, reaching at its maximum about 125 pounds pressure per square inch. This pressure is gradually decreased until morning, when the cylinder is again opened and its contents removed. Where plants have two hardening cylinders working side by side it is the custom to operate them alternately, blowing off the steam from one cylinder into the other, and thus saving a portion of steam which is otherwise wasted. As stated above, in some forms of cars lime is placed in the cylinder at the same time as the brick. This is done for the purpose of utilizing the same steam that hardens the brick for slaking the lime for the next day's turn, and it is argued that this procedure aids in hardening the brick.

The molds of the press are lined with tool steel lining plates, which can be reground when they become dull and replaced when they become too thin for use.

the Anderson Foundry & Machine Works, are preparing to build presses of the rotary type, in which the brick will be pressed on a revolving table. This type of press will be used in plants where the character of the sand is such as to make the green bricks after pressing too tender to be handled by plunger presses of the Berg type.

Frank H. Mason, Consul-General to Germany, has made a report on the sand-lime brick industry of Germany, in which he quotes tests conducted at the Swiss Imperial testing station to show that sand-lime brick withstands extremes of cold, moisture and dryness, if anything, better than ordinary burned brick, and that buildings erected 20 years ago from this brick in the early days of the sand-lime brick industry in Germany show that the sand-lime brick grows harder with age.

Mr. Mason also devotes considerable space in his report to the injury done the sand-lime brick propaganda in the United States by adventurers who mulcted Americans in large sums of money for patent rights on a process that was neither patented nor patentable. One of the "systems" thus sold to Americans involved the use of a dilute solution of hydrochloric acid in the

mortar. Another had a patent on mixing soda or potash, or both. The American Sand-Lime Brick Company of Chicago, the promoters of the plants named in this article, state that the use of chemicals of any kind, aside from lime, in the mixture with sand not only involves an additional expense, but is likely to interfere with the proper union of the lime and silica, and thus produce a brick that is softer than bricks made by the more simple process. The process for making the artificial sandstone or sand-lime brick is fundamental and unpatentable, and the installation of the system involves no royalties, except, of course, the patented details of the press and other machinery.

The cost of installing a plant is estimated to be on the basis of $20,000 for a complete plant that will turn out 20,000 bricks daily, with a decrease in cost in proportion to output for larger plants, and somewhat of an increase in cost for plants with less output. The cost of making the brick itself, including the cost of lime, labor, fuel, &c., but not including cost of sand, ranges from $2 to $3.50 per 1000 brick, according to local conditions, the maximum figure being that for the Black Hills plant, where labor and fuel are high. The percentage and cost of lime also have a bearing on the cost

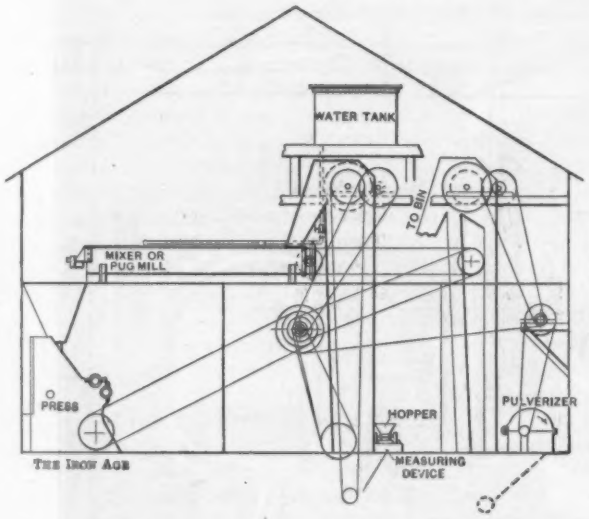


Fig. 3.—Side Elevation, Showing Equipment of the Main Machine Room.

of the brick, a loose, light, round grained sand requiring a larger percentage of lime than sharp, heavy sand. The extremes are 5 to 15 per cent. lime.

It will be thus seen that brick by the sand-lime process can be sold in competition with the cheapest clay brick, while its makers state that its greater density, its sharpness, uniformity and regularity of outline, and frequently its beauty of grain, put it in the class of fancy brick to be sold in competition with dry pressed and repressed front brick quoted from $15 to $24 per 1000.

The natural color of sand-lime brick made from ordinary sand is a grayish white. Black, yellow and red sands, of course, modify the color. It is the practice of makers of this brick, however, to furnish brick of any shade, solid or mottled, by the use of coloring materials. Where sand is not available, or where special effects are desired, brick are made by this process from furnace slag, coal ashes, rock and other minerals, ground to the desired fineness. A handsome black brick is also made from worn out foundry sand.

Plants for making sand-lime brick by the German process, using German machinery, are in operation at Michigan City, Ind., and Muskegon, Mich., and it is stated that though they are running full time, 300 days in the year, they are not able to keep pace with the demand for their product. The promoters of the American system claim that their process, while fundamentally the same as the German process, has the advantage over the latter due to the employment of machinery that greatly reduces the labor cost and produces a brick that is sharper in outline than is made by the German built plants.

Stone, Lime and Cement Associations Meet.

Three conventions in Chicago and one in Pittsburgh, almost simultaneously, brought together all the leading prdoucers of cut stone, quarried stone, cement and lime for a discussion of present conditions in their trade, for regulation of output and for placing themselves in a position to meet and overcome any unjust demands made by labor.

The National Cut Stone Contractors' Association was formed at a meeting held at the Grand Pacific Hotel, Chicago, January 20 and 21. At the meeting were represented 22 cities in 15 States, from Colorado to the Atlantic Coast. The objects of the organization are stated as follows: "To promote and protect the interests of its members and further the use of stone as a building material; to use our united efforts to cheapen the cost of cut stone, so that it may be used in preference to substitutes; jointly to meet labor as local conditions can be best served, always treating labor fairly, believing in arbitration and conciliation; to encourage the formation of associations of cut stone contractors, all in conformity with the laws and Constitution of the United States; but there is no intention, nor shall there be any action on the part of the association to control or in any way to deal with prices or restrict competition." The following officers were elected: President, Charles H. Isele, Peoria, Ill.; first vice-president, George Dugan, Bedford, Ind.; second vice-president, R. E. Harrsch, Chicago; secretary, Henry Struble, Chicago; treasurer, J. W. Melville, Pittsburgh; Executive Committee: S. W. Lederer, St. Louis; E. F. Giberson, Brooklyn; Fred. Andres, Milwaukee; Albert Shaw, Omaha; Peter Gray, Philadelphia.

The Central Cement Association held its meeting at the Grand Pacific January 21. It was not an annual meeting, but a special meeting called for the purpose of adjusting the business of the members of the association to present trade conditions. It was decided at the convention that no member should quote on cement for future delivery. This is understood by the trade generally to mean that prices will be advanced shortly.

The first annual meeting of the Quarry Owners' Association, which was formed a year ago, was held at the Grand Pacific on January 21. During the interval of a year the membership has grown from 50 to 125 members, representing the largest quarry interests all over the United States. No definite plans were arrived at, though general discussions were entered into as to improved methods and machinery in quarry practice, and members from various points reported trade conditions there, prices prevailing, the attitude of labor and the state of the trade generally. While it is not possible for the association to take an active hand as a body in the settlement of labor difficulties, its influence will be directed toward securing a fair and equitable solution of all troubles of this kind. It was decided that the next meeting should be held in June, although the place was left for the Board of Directors. The following officers were re-elected: President, D. McL. McKay, Chicago; first vice-president, W. H. Wallace, Bay Port, Mich.; second vice-president, F. A. Brown, Aberdeen, S. D.; third vice-president, S. M. Hall, Bucyrus, Ohio; E. H. Defebaugh, Louisville, Ky., secretary and treasurer.

The National Lime Association met in Pittsburgh January 19 and 20, working along very much the same lines as the other associations above named.

While there was no acknowledged connection between the simultaneous meeting of these four allied interests, it seems to be generally understood that they will work in harmony with each other wherever possible, particularly in the matter of coping with labor demands.

Merrill Callaway of Macon, Ga., has been appointed receiver for the Georgia Car & Mfg. Company, Savannah, Ga. The plant is said to be worth in the neighborhood of $300,000.

Conditions Which Surround the Iron Producer in the United States and Great Britain Compared.—I.

BY GEORGE H. HULL.

In Great Britain, as in the United States, all constructive projects of any considerable magnitude, such as buildings, ships and railroads, are arranged for in advance by a contract between the projector and the builder. The projector first has prepared for him plans and specifications. Copies of these plans and specifications he sends to several builders for the purpose of securing several bids on the work. Each builder makes his estimate of what the work will cost, adds to this estimate a certain percentage for his profit, and then makes a bid on the work for a certain specified sum. If the projector accepts one of these bids he then enters into a contract with the successful bidder. This contract not only embodies a price for the entire work, but usually embodies a specified time in which it is to be completed. On work of great magnitude, which will require a long time to complete and which will consume a large amount of iron, it is customary for builders in each of these countries to protect themselves against any possible loss which might otherwise come to them by means of any large advance in the price of iron during the progress of the work.

The manner of protecting themselves against such loss which has grown up in these two countries is radically different. To illustrate this difference, we will suppose that a contract has been made in each country, which provides for certain constructive work which is to be completed within 12 months; that this work will require 12,000 tons of iron at the rate of 1000 tons per month.

In the United States the builder protects himself against loss by making a contract with the iron producer to deliver him 12,000 tons of iron at the rate of 1000 tons per month at the price current at the time the contract is made. Thus the risk of loss is transferred from the builder to the iron producer, without any compensation to the producer for the risk which he assumes. Through this custom it has come to pass that the American iron producer necessarily has his future product sold to the consumer at fixed prices for many months ahead.

In ordinary times, when there are no considerable fluctuations in the price of iron and no unusual amount of building, no particular harm comes from the American custom; but when the periods of great industrial activity, which we call booms, come to the country the number of these constructive contracts is very great, the amount involved very large. Most of them require many months to complete, and in consequence most of the iron producers have their future product sold by contract, at fixed prices, for many months ahead, before the boom has fully revealed itself, and before there has occurred any marked advance in prices. If the boom and high prices continue no longer than the time required to fill these low priced contracts, then the iron producers have utterly thrown away the large profit they might have made had they reserved the opportunity of realizing the high prices current during the boom period. This seems a great hardship for the American iron producer, but as long as there is no other way in the United States for the builders to protect themselves, it is difficult to see how this custom can be avoided, for as long as there are such great advances in the price of iron, no prudent builder would undertake large constructive contracts without protection.

In Great Britain, on the other hand, the builder protects himself against loss by making a contract with the warrant dealer to deliver him warrants for 12,000 tons of iron, at the rate of 1000 tons per month at the price current on the day the contract is made. This protection is furnished at a rate of charges which are as well established in that country as are the charges for life, marine or fire insurance. Thus in Great Britain, by legitimate business methods, the risk of loss is transferred from the builder to the warrant dealer, who receives the customary rate of compensation for the risk.

The British iron producer will sell the consumer only for cash and prompt delivery. He studiously reserves for himself the opportunity of reaping the profit of the great advances in prices which never fail to come in periods of activity. The only occasion on which the British iron producer sells for delivery a long time ahead is to protect himself against possible loss when he anticipates a fall in prices; but he does not make these sales to consumers who might fail to keep their contracts. He makes them through warrants, on exchange, where margins must be put up and kept good, or the contract is immediately forfeited and the margins used to secure a new contract with another dealer.

The Warrant System and Its Effects.

The British pig iron warrant system originated in Scotland in or about the year 1840. It grew up spontaneously, or at least without any preconceived idea or intention. A party purchased 10,000 tons of iron, for which he took a furnace company's warehouse receipts. When he decided to part with his holdings, he sold these warehouse receipts instead of selling the iron itself. The usefulness of these receipts was soon evidenced by the fact that they were resold repeatedly, and passed from hand to hand among iron dealers. It was soon noticed that on account of their convenience they invariably brought more money than the iron they represented. This resulted in other producers piling iron up in their yards and selling it through warehouse receipts. These additional receipts were rapidly absorbed by the iron dealers. Later on, builders who had made large contracts for construction bought receipts to protect themselves against loss through advances in the price of iron. Builders of large responsibility found it easy to carry these receipts in bank, but it was not so easy for the smaller and less responsible ones, who needed the protection just as much as the large ones. Through this condition iron dealers commenced to make contracts with builders to protect them against advances in iron. When the dealers entered into these contracts to protect the builders, they were obliged to buy receipts to protect themselves. This in time necessitated large purchases and large carriage of receipts by the iron dealers.

At first the Scotch warrants consisted of scrip or storage receipts issued by the pig iron makers, but when a great many iron makers commenced to issue these warehouse receipts so many irregularities occurred that the pig iron warehouse receipts of scrip commenced to lose their high standing, and it was found necessary to have the iron stored in the possession of one independent firm of undoubted responsibility who were in no way connected with any other business. Connal & Co., now Connal & Co., Limited, were this firm, and it was this firm who inaugurated the system of issuing the present "store keepers' warrant."

Until recent times these warrants were issued against iron placed in central yards; hence to procure a warrant a furnace company were obliged to ship their iron from where it was made to these central yards, thus necessitating an expense for freight and handling. The cost of procuring a warrant to the furnaces nearest the Glasgow yards was about 62 cents per ton; the cost to the furnaces furthest from this central point was about $1.25 per ton, and yet the warrant system proved so desirable that it continued to exist, notwithstanding this large initial cost.

When the American warrant system was inaugurated on the basis of opening yards near the furnace where the iron could be put into the warrant yard at little or no initial expense, it was adopted in Great Britain, and proved such an advantage over the old system that the central yards commenced to lose iron from that time and the yards near furnaces commenced to increase. In 1895 Connal & Co., Limited, were already discussing the propriety of discontinuing their central yards in Glasgow and selling the property. Within the last few months this has been determined upon. The old system, therefore, is being discontinued, but the system itself, as remodeled, is more popular in Great Britain than ever before. There are in Glasgow alone more than 70 houses who make a specialty of dealing in pig iron warrants.

There is an impression among many that in Great Britain consumers purchase by warrant the iron they consume. This is a mistake. Consumers buy nearly all the iron they use from the makers, or their agents. They each have their preference as to the brands they use, as well as the firms they buy from. Many of these business affinities last for a life time. The warrants which the consumers contract for as a protection are to them nothing more than a protection. As the months roll by they purchase the iron or steel they wish for their work of the brand, quality and shape they require, and simultaneously sell on exchange their warrants. If iron has gone up, say 20 shillings, they pay about that much more for their material, and they get that much more for their warrants. If iron has gone down, say 20 shillings, they buy their material for about that much less and get that much less for their warrants. In this manner they eliminate any speculative element from their business and thus insure their legitimate builders' profits.

There is a wide difference between the market prices of various brands of iron in Great Britain, and the market price for "warrants" (which word specifies no special brand). When one buys "warrants" he must take what the seller delivers, and the seller will naturally deliver the poorest brand in store; hence, the "warrant" price corresponds to the poorest iron in warrant yards. When one buys warrants for a specified brand he must pay the customary difference between the brand called for and the current "warrant" price. The makers of the superior brands have no difficulty in getting the difference their brand is entitled to, at any time.

In Great Britain, where the warrant system is supplemented by daily exchange sales, the necessity for the producer to borrow is entirely done away with. Whenever he accumulates any surplus iron he has simply to put it into warrants; these he can sell for cash on exchange at an expense of about a penny a ton, and if at any time he wishes to buy this iron back, he can do so, if it has not already been consumed, at an expense of about a penny a ton, thus at an expense of about 2 pennies a ton, barring the changes in the market, the producer can have his iron carried for him any length of time.

A warrant dealer in Great Britain will sell protection to a builder for five years ahead, just as readily as he will for six months or a year ahead. The charge he makes for such protection is based on what it will cost him to buy iron by warrant the day he makes the contract, and carry said iron to the dates of delivery called for by the contract. When the warrant dealer enters into a contract to protect a builder against advances in iron, he must necessarily buy warrants to protect himself, and as long as the contract of protection runs he must own and carry warrants to protect himself.

The establishment of the warrant system was as great a relief to the iron producers of Great Britain as was the establishment of the national banking system to the financial exigencies of the United States: one created a demand for bonds which never before existed, the other created a demand for iron which had never before existed; one necessited the carriage of bonds by every national bank, the other necessitated the carriage of iron by every warrant dealer.

Every man is interested in sustaining the price of what he owns and is compelled to carry. Thus the iron producer is assured of the powerful influence of the warrant dealer in sustaining stability in prices. Individual dealers, to be sure, when they wish to buy largely, will do all they can to depress prices for the moment; when they wish to sell largely, however, they will do all they can to advance them for the moment; while the third party, the large holder, will at all times strive to hold prices up. Hence the dominating influence is always exerted in upholding prices. These conditions partly explain why Scotland has carried an average stock of iron equal to nine months' production for the last 20 years, with more ease and with less injury to prices than the United States has for the same period been able to carry an average stock of iron equal to a few weeks' production.

The dealer's market does not depend upon speculation for its life; that is merely an incident. The dealer's demand is just as legitimate as the consumer's demand. The dealer could no more continue his business without iron than the consumer could; hence the dealer's demand is fully as reliable and as sustaining to prices.

When a warrant dealer gives a protective contract for a certain amount of iron he does not necessarily buy an equal amount; he will in all probability buy and carry at the beginning as much as 25 per cent., on the same principle that a bank which had issued a certain amount in circulating notes would buy and carry in gold as much as 25 per cent. of their amount. During the time in which the dealer carries but 25 per cent. of iron against his protective contracts he earns a revenue equal in amount to the storage and interest on the other 75 per cent. Through years of experience this revenue has proven sufficient to cover the dealer's risk against advancing prices, when he fails to cover for the full amount. It is this unfilled gap, whether of 75 per cent. or less, which the dealer knows must eventually be provided for, which keeps him at all times on the lookout and keen to pick up any lots of surplus iron which the consumer does not require. But there is never enough iron produced to wholly fill this gap, and so it is that the prominent feature of the British iron market is that there is always a "yearning void," "a demand which is never satisfied."

The prominent feature which distinguishes the American mode of selling iron is that the consumer is being constantly visited and importuned to buy. The producer naturally seeks to employ the most successful selling agent. The selling agent who did not visit the consumer would sell little or no iron, and would lose both his customers and his agency. As long as the consumer is the only buyer of iron there will be an unsought surplus, and that surplus will seek the buyer in some way.

In discussing the warrant system a Glasgow gentleman said, in effect, that the warrant system has been to us a great educator. Through it we have learned to take broad views of business. We look upon prices and stocks of iron not in the light of a month or a year, but in the light of 10 or 50 years. We argue that what has occurred in the past will be repeated in the future, if the same causes exist in the future. We have learned that every few years there is a sudden and great increase in the demand for iron, with a corresponding increase in its price, and we shape all our business caluculations to take advantage of these periodic conditions, with little regard to what the conditions are for the current month or year. The warrant dealer, for instance, in deciding what percentage of warrants he will carry from time to time against his protective contract, is largely governed by what he estimates to be the magnitude of his risk from time to time. If, for instance, the price of iron during years of dullness falls to 37 shillings, and the price during years of prosperity rises to 70 shillings, he knows that when the market price is in the neighborhood of 37 shillings his risk is comparatively large, hence he aims to carry a large amount of warrants against his protective contracts. When, on the other hand, the market price is in the neighborhood of 70 shillings, he knows his risk is comparatively small, hence he aims to carry a small amount of warrants against his protective contracts. If these conditions resulted in bringing both the consumer and the dealer into the market for their heaviest purchases at the same time, it would have a tendency to increase the extreme fluctuations, but fortunately prices are lowest when consumers are taking the least, and low prices is the incentive which causes the dealers to make their largest purchases; then, when prosperous times and high prices return, in which the consumers are making their heaviest purchases, the dealers are making their lightest purchases. Thus the warrant system, through the free working of natural conditions, becomes the balance wheel or regulator of the iron supply.

Through years of experience it has been found that the demand from consumers is so great during booms that they need all the iron in existence, and at the same time the warrant dealer must hold iron in some manner to make himself safe on his protective contracts. It

has come to pass, therefore, that when all the reserve iron goes out of warrant yards during a boom, the warrant dealer, if he protects himself at all, can only do so by making purchases of iron for future delivery from the iron maker. As noted before, the iron maker never sells iron for delivery a long time ahead, except to protect himself against a decline, and then he sells by warrant, on exchange. Thus it has come about that when the period of high prices comes in which the iron maker finds it to his interest to sell a long time ahead he has a natural market created for him; that is, the warrant dealer lets his spot iron go to the consumer, and protects himself by future delivery contracts with the maker.

During the last 15 years the production of iron has been so small in Great Britain that the dealers have not been able to secure their usual stocks, and have already commenced to look to other iron countries for part of the iron necessary to cover their protective contracts. Some of the British dealers have carried American warrants and have already signified their desire to introduce them to dealings on the Royal Exchange of Glasgow as soon as they are sold on exchange in the United States in sufficient quantities to furnish daily official quotations. The American market will therefore have the benefit of British carriage of reserve stocks as soon as conditions will justify.

One of the great engineers of the last generation once said, in substance, that whenever man tries to resist nature, he is certain to meet defeat, while if he will but study nature's laws and fit his plans to them he can with their aid accomplish what would otherwise have been an impossibility. Take water, for instance. How utterly powerless man is against its force, and yet by studying its nature and conforming his plans to its laws he can accomplish with its aid what would otherwise be impossible. This is the essence of the success of the British iron system. The natural tendencies which pertain to the iron business have not been resisted; no attempt has been made to restrict production or force prices. Every tendency is allowed to take its natural course. The trade have simply studied the natural laws of the iron business, and by conforming their plans to these laws have made them serve their purpose, and accomplished what would have been impossible without such aid.

Supply and Demand.

The British iron master believes implicitly in the law of supply and demand. He believes that prices go up when the demand exceeds the supply, and that they go down when the supply exceeds the demand, but he never makes the mistake of confusing the word "stock" with the word "supply." Whether the stock is large or small does not depend on its amount, but on whether the stock, added to current product, is more than sufficient, or less than sufficient, to supply the demand which is to be made upon it. A very large amount of stock may be part of a very small supply, and a very small amount of stock may be part of a very large supply. As an evidence of this he points to the year 1888-1889, when the stock of Scotch pig iron in Connal's stores alone was equal to 14 months' production, and yet the supply was so inadequate that the price rose within six months from 37 shillings 1 penny to 64 shillings 10 pence, and to the year 1874-1875, when the stock was down to 17,000 tons, and yet the supply was so excessive that the price fell from 109 to 57 shillings 6 pence.

If the commodity being considered is one the production of which can be increased quickly enough to supply any sudden large demand, then a small quantity may be an ample stock, but if it is an article the consumption of which may increase 100 per cent. within six months, and the production cannot be increased in like proportions under 12 months, then nothing short of a quantity equal to six months' production would be an ample stock.

Another gentleman in Glasgow, speaking of iron stocks, said, in substance, "We are never frightened by seeing the stock of iron in Scotland increase gradually to six, nine and 12 months' production. We know that as a time for a return to prosperity approaches it is the custom of dealers to protect themselves by carrying a large percentage of iron against their contracts. We interpret the large accumulation to mean that the dealers are looking for the periodic advance; and we know from experience that any stock which can possibly be accumulated, no matter how large, will be absorbed by actual consumption when the prosperous time comes." They point with pride to statistics as evidence that every great advance which has occurred in the price of pig iron in Great Britain has commenced when stocks were very large. They are, therefore, never afraid of stocks getting too large; their only fear is that they may not get large enough. Five times they have seen accumulations ranging from seven to 14 months' production exhausted by actual consumption. Five times the dealers have absorbed all the surplus iron the furnaces have turned out during long years of dullness, and five times it has been taken off their hands at enormous prices.

Fluctuations.

In comparing the extreme fluctuations in the prices of pig iron in the two countries, it is found that the price of iron does not go as low in Great Britain in depressed times, or as high in properous times, as it does in the United States. For instance, during the last depression the lowest price reached in Great Britain was 44 shillings 2 pence, equal to $10.58, in Glasgow, as against $6 in Alabama. The highest price reached was $17.77 in Glasgow, as against $25 in Alabama. Here we have within the last five years a fluctuation of 68 per cent. in Great Britain, against a fluctuation of 316 per cent. in the United States. Reviewing the past, we find that in the 1880 period there was a fluctuation of 60 per cent. in Glasgow, as against 125 per cent. in Cincinnati. In the 1864 period a fluctuation of 45 per cent. in Glasgow, as against 344 per cent. in Cincinnati. In the 1854 period a fluctuation of 45 per cent. in Glasgow, as against 163 per cent. in Cincinnati.

There is a belief among many people that to introduce any commodity to exchange dealings is certain to bring about greater fluctuations in the price of that commodity. Investigation has shown that the result is directly the opposite. In 1889 an expert accountant was employed for several weeks to tabulate the price of all exchange commodities; first for the years they had been dealt in on exchanges, and then an equal number of years before they were dealt in on exchanges. The facts revealed by this investigation are impressive. The extreme fluctuations in the price of wheat for the first 11 years during which it was dealt in on exchange was 141 per cent., as against 290 per cent. for the last 11 years before it was dealt in on exchange. In corn, the extreme fluctuation was 200 per cent. for the first 11 years during exchange dealings, against 315 per cent. for the last 11 years before exchange dealings. In mineral oil, the extreme fluctuation was 64 cents to $1.06 per barrel at the wells during the first nine years it was dealt in on exchange, whereas the extreme fluctuation was from 52 cents to $7.88 the last nine years before it was dealt in on exchange. So with every commodity which has been introduced on exchange, the dealings have resulted in a pronounced curtailment of the extreme fluctuations. In other words, exchange dealings have had the effect of bringing about greater stability in the price of each and every commodify brought under the influence of such dealings.

But this was not the most remarkable feature disclosed by the investigation. It was found that before the introduction to exchange dealings only small stocks were accumulated, and these were a great burden to the producers, whereas after exchange dealings were inaugurated enormous stocks were carried by outside capital, and the producers were entirely relieved of all such burdens. For instance, the largest stock of oil carried before it was dealt in on exchange was 500,000 barrels, and this stock proved such a burden to the producers that it carried prices down to 52 cents per barrel. After it was introduced to exchange dealings the stock soon rose to 36,000,000 barrels, and this large stock was carried by outside capital with such ease that the lowest price reached during the first nine years of exchange dealings was 64 cents per barrel at the wells.

The injuries which result to the iron producing business from abnormal advances in the price of iron are

many; among these is the abnormal advance in the cost of its production. When the inevitable decline in prices comes it is very rapid in this country, and in a very short time the selling price is carried below the cost of production. The reason the decline is so rapid is that all the surplus iron made must be carried by the producers, or forced off on the consumers in advance of their requirements; when the latter method is resorted to a large concession in price is made on each new sale, and thus the price is carried down rapidly from week to week. In the United States a single forced sale will sometimes break the market as much as one or two dollars per ton. But how can this be avoided as long as forced sales cannot be avoided, and the consumer is the only buyer? In Great Britain, when a forced sale is made, it is done on exchange, at a concession of perhaps one or two pennies per ton, instead of one or two dollars.

The writer was told by dealers in Glasgow that if an attempt was made to force off 10,000 tons of iron on the consumers' market in Great Britain it would be fully as disastrous to prices as it is in this country, whereas 10,000 tons can be forced off by warrant, on exchange, within an hour, without depressing prices more than one penny a ton. One gentleman exhibited his books to show that a forced sale of 30,000 tons had been made for a certain party, on a dull market, between noon one day and noon the next, which had forced the price down but one penny and a half, and added that this was a fair example of what could be done at almost any time.

The British iron master is never forced to seek the consumer; he waits for the consumer to come to him; this the consumer is sure to do when he needs iron, and, when he does, a sale can be made without any sacrifice.

(To be continued.)

The Armor Plate Contracts.

No "Understanding" Between the Government and the Manufacturers.

WASHINGTON, January 26, 1904.—The House Committee on Naval Affairs has received from Admiral O'Neil, Chief of the Bureau of Ordnance, a memorandum in reply to certain questions propounded by the committee with reference to a statement alleged to have been made by Charles M. Schwab, ex-president of the United States Steel Corporation, to the effect that "it was the understanding with the Government when the Carnegie Company erected an armor plate plant that the Carnegie and Bethlehem Companies were to share the work and that the price at which the contract was to be awarded was always understood by the Government before the bids were submitted." Admiral O'Neil was interrogated as to the correctness of this statement and also as to how many tons of armor plate each of these companies has furnished, or contracted to furnish, up to the present time and the price therefor, and whether any other company has furnished armor plate and, if so, at what price.

Admiral O'Neil utilizes these interrogatories as the text for a highly interesting statement of the development of the armor making industry in the United States, and makes entirely clear that whether Mr. Schwab was correctly or incorrectly quoted, the Government has at no time been in collusion with the armor plate manufacturers, but has constantly sought to secure armor at the lowest possible price and has been fairly successful in this effort. Incidentally, Admiral O'Neil brings out the interesting fact that up to the present time the armor plate contracts let by the Navy Department have aggregated no less than 95,223 tons at a cost of $47,468,388.

Taking up the question as to whether the price at which armor was to be delivered has always been understood by the Government before the bids were submitted, Admiral O'Neil says that it is impossible for him, or for any one now in the Navy Department, to say from his own knowledge what understanding Secretary Tracy may have had with the Carnegie Steel Company when he gave them his first contract for 6054 tons of armor, on November 20, 1890, or what his ideas were with respect to future contracts. He adds, however, that certain special reports of the Secretary of the Navy in 1891 and 1892 throw considerable light on the subject, and he proceeds to make some significant quotations therefrom.

These reports show that from the outset the Navy Department endeavored to induce the Carnegie Company to undertake the production of armor plate on the basis of competition with the Bethlehem Company, and largely because of the "unsatisfactory condition at that time of the work under the Bethlehem contract." With regard to this movement on the part of the Department, Secretary Tracy in his report for 1892 said that "although the Department was disposed to make all possible allowance for the difficulties of beginning the manufacture of armor in the hope that the Bethlehem Company might be able to make an approximation to the fulfillment of their contract, they nevertheless foresaw during the course of the year 1890 that unless some step was taken to provide an additional supply, the completion of all the armored ships then under construction would be delayed for an indefinite time, and to prevent this a contract was made November 20 of that year with Carnegie, Phipps & Co. to make and deliver about 6000 tons of armor at the price named in the Bethlehem contract."

The Original Contract.

Continuing, Admiral O'Neil states that the original Bethlehem contract referred to by Secretary Tracy was awarded by Secretary Whitney after competition by public advertisement, and that "there is no reason to suppose that there was the slightest collusion between the respective bidders and the Government in the case of this the first armor contract." That Secretary Tracy, before giving the Carnegie Company a contract at the same price as the Bethlehem Company, undertook to obtain the armor at a less price, was stated by Secretary Tracy himself, and by Mr. Carnegie, in evidence given by them before the Senate Committee on Naval Affairs, when Secretary Tracy testified that "I wanted them to manufacture it at a less price because, to my mind, the price paid to Bethlehem seemed to be an excessive price, and I tried to make a better bargain," but Mr. Carnegie was positive and absolute that he would not make a different price from that made with Bethlehem.

The first contract with the Carnegie Company is stated by Admiral O'Neil to be the only armor contract ever made without advertisement, Congress having passed in the following year an act requiring that all armor plate be thereafter procured by competition after public advertisement. When the third contract was made, in 1893, both companies bid the same price and the total amount was divided between them. As to the coincidence of price, Admiral O'Neil says that "there is no reason to suppose that there was an collusion or understanding between the bidders and any Government official or other person as to those bids, or that the price to be paid was known to the Navy Department beforehand, but it is manifest that there was an understanding between the respective bidders as to the price they would bid, as both bid exactly alike." Similar conditions were encountered by the Department as to the fourth, fifth and sixth contracts, as to which Admiral O'Neil says that there was no collusion between the bidders and any officer of the Government, nor was the price to be paid known beforehand to the Navy Department. It was obvious, however, that the bidders had an understanding.

The Government Factory Alternative.

The seventh contract, the largest ever made, was executed November 26 and 28, 1900. There were three bidders under this advertisement—namely, the Bethlehem Steel Company, the Carnegie Steel Company and the Midvale Steel Company. The two former bid the same—namely, $445 a ton plus a royalty of $25 for the best class of armor—and coupled their bid with the proviso that it was only good if they were awarded one-half of the total quantity included in the advertisement. The Midvale Steel Company submitted a bid for the best quality of armor, the prices ranging from $438 to $530 a ton, depending upon the amount, with the provision that they were to receive an award of not less than 20,000 tons. All these bids were rejected and the Secretary of the Navy took up for consideration the act of June 7.

1900, authorizing the Department to procure a site and erect a Government factory if unable to purchase armor at "reasonable and equitable prices." Subsequently negotiations with the bidders were renewed, the Midvale Steel Company withdrew, and ultimately awards were made dividing the armor between the Carnegie and Bethlehem companies at $420 per ton, exclusive of such royalties as the manufacturers might be obliged to pay. In commenting upon these proceedings Admiral O'Neil says that "it is quite evident from the above facts that there was no collusion or previous understanding between the bidders and the Department as to the prices to be bid, or as to the awards, and that the Department used every effort to reduce the cost of armor and would have been glad to award a suitable amount of armor to the third bidder, and contemplated doing so had they not withdrawn from the field."

The eighth contract was made in February, 1903, and only two bids were received, one from the Bethlehem and one from the Carnegie Company. Both bids were alike, the prices being the same as in the preceding contract. The award was made by an approximately equal division among the two companies, with regard to which Admiral O'Neil says: "It can be positively asserted that there was no collusion or understanding between the bidders and the Government as to the price to be bid, or in any other respect, with regard to these contracts. The award was equally divided in order that the Department might have the benefit of the maximum output of both bidders."

With regard to the ninth and last armor contracts, which were made in December, 1903, and January, 1904, Admiral O'Neil says:

"Three bids were received, from the Bethlehem Steel Company, the Carnegie Steel Company and the Midvale Steel Company respectively, the two former bidding alike and the same prices as under the preceding bidding—that is, $420 plus a royalty of $33.07 per ton for the best quality of armor—the Midvale Steel Company bidding $398 a ton for armor of this class. Under this bidding the Midvale Steel Company were awarded 6180 tons of armor, the Bethlehem Steel Company 5372 tons, and the Carnegie Steel Company 5258 tons. The Midvale Steel Company would have been given an award for a greater quantity, except that by the terms of their bid deliveries would not be made in time for the vessels for which the armor was intended; moreover, the Midvale Steel Company, having had no previous experience in the manufacture of armor, may be expected to experience considerable difficulty and delay in turning out a satisfactory product."

An Emphatic Denial.

Summing up the facts with regard to all contracts let during his incumbency of the post of Chief of the Bureau of Ordnance, Admiral O'Neil says:

"Since June 1, 1897, a period of nearly seven years, I have held the position of Chief of the Bureau of Ordnance, and am thoroughly conversant with every detail in connection with all the armor contracts made during that period, in which about 69,000 tons of armor has been contracted for—that is, about 70 per cent. of all the armor contracted for for the Government—and I can say without any reservation that during this period there has been no collusion or understanding with the bidders as to the price to be bid, nor has there been any previous understanding as to how much armor would be awarded to any bidder. When the bids were alike and confined to two bidders it has been the general practice to divide the award equally between them, not on account of any agreement to do so, but because by so doing more prompt deliveries would be insured, and because the requirements of the Government demanded the maximum output of the only two concerns—namely, the Bethlehem and the Carnegie Works—which were equipped for the manufacture of armor."

Replying to the second question, as to how many tons of armor plate each of the companies has furnished or contracted to furnish the Government within the past ten years, and the price therefor, Admiral O'Neil submits a table showing that the Bethlehem Steel Company's contracts aggregated 42,438 tons at a total cost of $23,081,615; the Carnegie Company's, 46,605 tons at a cost of $21,933,351, and the Midvale Steel Company's, 6180 tons at a cost of $2,453,422, or a grand total of 95,223 tons at a cost of $47,468,388. The highest price per ton was $671.13, paid to the Carnegie Company under the contract of 1893, and the lowest price was $396.99, the bid of the Midvale Steel Company, under the contract of December 15, 1903, upon which no deliveries have yet been made.

The third question, as to whether any other company has furnished armor plate for the Government than the Bethlehem and Carnegie companies, is answered in the statements above submitted by Admiral O'Neil. In conclusion, he says:

"From the foregoing it will be seen that there is no understanding on the part of the Government that the Carnegie and Bethlehem companies were or are to share the work of making armor for the Government, or that the price at which contracts were or are to be awarded was or is always understood by the Government before the bids were submitted. In further support of the evidence that the Government was not in collusion with the armor manufacturers, attention is invited to the fact that the Secretary of the Navy (Mr. Herbert) in his annual report of 1896 brought to the attention of the President his successful efforts to reduce the cost of armor for the 'Kearsage' and 'Kentucky,' which was followed at a later period by a Congressional inquiry into the cost of armor. A report of this investigation is contained in Document 151, House of Representatives, Fifty-fourth Congress, second session, in which, as will be seen on page 44, Secretary Herbert recommended that Congress should authorize the erection of an armor plant should the Navy Department be unable to contract for armor at a fair price.

"I consider the present situation with regard to armor very satisfactory, as there are two large and well equipped establishments, having great experience, turning out armor in quantities considerably in excess of the contract stipulations, which is most advantageous to the Government, and a third bidder has come into the field at a lower price.

"These three establishments will probably be able to meet the requirements of the Government for a number of years to come, but how they will bid in the future remains to be seen. The cost of armor is considerably less in the United States than it is abroad, while the quality is equal to the best that is made anywhere. The armor for all ships authorized to date has been contracted for."

Admiral O'Neil's answers to the Naval Committee's questions are regarded by the committee as full and conclusive, and the incident is therefore considered as closed.

W. L. C.

L. H. O'Donnell, who has been for some years secretary and general manager of the Chicago Steel Mfg. Company, Hammond, Ind., has withdrawn from his active official capacity with that company and purchased an interest in the business of the M. J. Carnahan Company of Washington and Loogootee, Ind., wholesale and retail hardware dealers. Mr. O'Donnell will assume his new duties February 1, though he still retains his financial interest and his position as secretary of the Chicago Steel Manufacturing Company. Mr. O'Donnell, previous to his association with the Chicago Steel Mfg. Company, was for ten years with H. A. Martens & Sons of Lancaster, Ohio, and ten years with the firm that he is now rejoining. In July, 1901, he organized the Collier Shovel & Stamping Company of Washington, Ind., which was later consolidated with the Chicago Steel Mfg. Company. Frank M. Baldwin, who is vice-president and treasurer of the Chicago Steel Mfg. Company, will assume the active management of the company in addition to his present duties. It will be recalled that the plant of the Chicago Steel Mfg. Company at Hammond was destroyed by fire several weeks ago and that it is to be rebuilt.

The Boston News Bureau reports that the Edison Electric Illuminating Company of Boston have during 1903 purchased 298,245 pounds of aluminum wire sufficient to equip 82 miles of high tension transmission line.

The Iron Age

New York, Thursday, January 28, 1904.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

Patents and the Patent Law.

The *Journal of the Association of Engineering Societies* for December contains two papers of more than ordinary general interest and importance, discussing the subject of patents and the administration of the patent laws. As this is a matter of consequence to all who have identification with the manufacturing interests of the country, as well as to the class known as "inventors"—a term not always accurately descriptive as applied to those who make what the Patent Office rules recognize as patentable inventions—these papers invite discussion. One is by George W. Dickie, past president of the Technical Society of the Pacific Coast, raising the question whether patent laws are longer necessary to progress in the mechanic arts; the other by John Richards, also past president of the same body, discussing patent law administration in this and other countries.

Mr. Dickie's views in support of his thesis are briefly summarized in the following paragraph:

> The whole reason for the existence of patents is the monopolizing by the inventor, for a limited period, of the benefits derived from an invention, on the supposition that there will result a lasting benefit to the public after the term of the patent has expired. A very small percentage of the patents granted meet this condition, for, to do so, they must cover real inventions. The mechanical arts have reached such a stage of development that new combinations of mechanical devices, in the sense of invention, are hardly possible, and, in my opinion, a patent should be issued only where some new contrivance has been invented to produce a new result. I would not have any real inventor go unrewarded, but, in order to recompense the few inventors who have done work worthy of recognition by their follow men, it should not be necessary for the public generally, and the mechanical arts in particular, to carry the huge load of patent protected devices of all sorts described in patent specifications, which, owing to cleverly worded claims, prevent a free application of the proper device to accomplish the end in view.

It would be difficult for one who should regard the question wholly free from the bias of self interest to resist the conclusion that Mr. Dickie is right, both in what he says and what he means. He illustrates his point by an example drawn from personal experience. In 1898 the Navy Department issued specifications for three battle ships containing the following provision: "Lifting gear shall be provided for all armored hatch covers which can be worked by hand power from above and from below. Such shutters and doors of armor as may be directed are to be fitted to be opened and closed by electric power, the electric power appliances to be worked without disconnecting the hand gear." Also the following: "The principal sliding water tight doors below the protective deck, as directed, to be capable of being operated on an approved system by power, each such door to be capable of being operated by hand or by power from either side, and all to be capable of being closed simultaneously from a distance by power from two stations located as directed." This problem was worked out *de novo*, by the combination of old and well-known elements to attain a perfectly natural result. In May, 1899, the plans were finished and a working model set up and tested in the yard of the Union Iron Works, San Francisco. In November of that year Mr. Dickie was invited to see a different arrangement in experimental operation at the Brooklyn Navy Yard. This was subsequently patented by the United States Naval Constructor who had designed it and built it; the patent, of 1900, was assigned to a company originally making doors operated by hydraulic power, and under its broad claims, covering the combination of a door, the bulkhead to which the door is secured and the mechanism for operating it, suit was brought against the San Francisco concern for heavy damages for infringement, and an injunction obtained restraining the use in Government work of a device designed and demonstrated months before the patent alleged to have been infringed was applied for. The case is a flagrant one, but in many respects typical. On it Mr. Dickie bases an argument, which we have not space to follow in detail, but which leads him to the following generalization:

> I do not wish to be understood as opposed to all patents. I believe in rewarding every one who, by invention or skill, succeeds in making new combinations of well-known devices to accomplish results whereby the public will be ultimately benefited, and I would have such rewards liberal and sure; but patent claims cleverly worded to cover combinations of well-known devices—to accomplish well-known results obtained for business purposes—that are to prevent others from using the same combinations or mechanical equivalents I would abolish, and thereby stop 90 per cent. of the patent business, with decided advantage to the real inventor, who at present is lost amid the multitude of imitation inventors and patent sharps.

That Mr. Dickie's plan for accomplishing the end he deems advantageous is not as satisfactory as his argument is convincing, is not surprising. It may take as long to wisely recast the patent law system of the United States as it has taken to build it up. It would require more than human intelligence to sit in judgment on patent applications and decide fairly and wisely which covered real inventions and which did not. Perhaps the end could be reached by an amendment to the law declaring unpatentable any combination of old elements which could reasonably be assumed to be an incident in the normal progress of the art. This would limit the patent privilege to the specific new thing invented or discovered, *per se*, and not as an element of a combination of well-known devices. A suggestion of the justice of this limitation is found in the refusal of the Patent Office to allow a claim for a general result independent of the way in which such result is attained. This, however, does not go far enough to meet the evil to which Mr. Dickie calls attention.

In general agreement with Mr. Dickie's contention, Mr. Richards has given attention to the causes tributary to the present extremely unsatisfactory operation of the patent laws, and to the means by which they may be corrected. However, he discovers the just grounds for objection rather in the administration of the patent laws than in the principle of protection to invention and adaptation of means to ends which is recognized in all countries having industrial interests to promote, except Holland. The following extract from his paper will be of interest to all for whom the subject has importance:

> Our laws permit or grant patents on the means or agents of production only—that is, on contrivances or discoveries that produce results, and particularly bar patents on principles or on modes of operating. This, it will be seen, opens the door for endless patents on nearly the same thing, with slight differences that often turn upon mere phrases of speech. The German Government grants patents on results, or, in their terms, on "new technical results," paying but little attention to means or implements. Claims to express compendiously the subject matter of an invention are limited to one that must involve what is called a "unitary concept." Other claims may be added, not more than three, explanatory of the first. This plainly involves a complete change of system. . . . It would be an enormous innovation in this country for our astute patent agents, who can write 20 permutation claims on a nutcracker, but it is an advance to a higher plane, is logical and must commend itself to all who will analyze the true spirit and intent of patent grants for inventions. This juggling system of "permutation claims" is a distinguishing feature of modern practice in this country. It is a device that had its origin

with patent agents, and because the claims in American patents were construed separately and independently. It is the reverse in England, where a patent falls with each and any of its claims; and in France, where, until very recently, a patent required no claim at all separate from the body of the specification. This latter system permitted full discretion to the courts, and this discretion, I am glad to say, has been seldom abused.

One of the difficulties of the American patent system is that its theory does not admit of application in practice. The talent required for the work of examination cannot be had for the salaries which the Government deems sufficient for the pay of officers charged with the delicate and responsible duty of passing upon applications. As Mr. Richards shows, the operation of the Federal Patent Office is "an amazing example of routine work, done by rule and apparently without personal discretion—by rules which have grown out of the conduct of the office and the circumstances of procedure." This is very exact and discriminating criticism. The tendency of the office is to become more and more technical. With limited sources of information, practically no knowledge of the state of the art, except as it is reflected in the patent records, and with more concern for a close observance of the "rules of practice," than for either novelty or utility, the office undertakes to allow or reject claims, and in its action is very largely, though, perhaps, unconsciously, guided by the skill of clever counsel, who have attained high proficiency in the art of drawing claims. Some time ago a test was made to see what could be patented in the way of a device so old that all record of its beginnings was lost. It was asserted by an expert in patent soliciting that he could obtain a patent for the usual and familiar form of coffee mill in almost universal use, and that the claims to cover it broadly could be so drawn that the office would allow them without amendment. The test was made, the application filed and an allowance obtained. The reason was that in no record likely to be accessible to the examiners was the coffee mill shown or described, and the claims to cover it could be so drawn that the familiar piece of kitchen furniture would not be called to mind. A condition of affairs which makes this possible is essentially unsatisfactory to every one but the solicitors.

Of the function of the examiner Mr. Richards says:

A primary examiner, instead of acting in what may be called a professional capacity, performs routine duties in which his individuality is usually eliminated. He does not even sign his decisions and has no power to amend them. No matter how mistaken they may be, they must go permanently into the record. But, strangest of all, he exercises a triple function, so to speak, being a whole tribunal in himself, acting as witness, counsel and judge. He prepares the evidence, presents it as attorney for the Government as against the client, and then passes judicially upon his own findings by deciding whether the applicant shall or shall not have the privilege of defending his claims in the law courts. These duties, instead of being professional and advisory, are arbitrary; they consequently fail to command the confidence of inventors and put the bureau in a false position before the country.

As illustrating how the present American system may work substantial injustice to the discoverer of a principle of prime value in the arts, Mr. Richards cites the case of Jearum Atkins, who, in 1853, filed in the Patent Office in Washington an application for a patent for a water wheel of the unfilled or impulse type, and in his specification set forth in the form of a well written treatise the principle on which such a wheel would operate. It was promptly rejected, on the ground that the device was inoperative and did not embody an invention. Being a poor man the inventor could not prosecute his claim through the courts, and thus lost the advantage of his original and valuable investigations. Some six years later Escher, Wyss & Co. of Zurich began making water wheels of the impulse type, and the practice quickly extended over Europe. It was introduced into this country in 1890 through the plans for the water wheels at Niagara, furnished by Fraesch & Picard of Geneva.

Another case in point is found in impulse-acting steam engines. This type was invented about 80 years ago by William Avery of Syracuse, but, as Mr. Richards shows, there is not in this country to-day a single maker of impulse-acting engines who is not imitating European types or paying tribute under American patents granted to foreigners. In 1895 a distinct invention in ignition apparatus for gas engines was made by George E. Hoyt of San Francisco. The application was promptly rejected, was vigorously prosecuted for two years and finally abandoned, but the device is to-day one of controlling importance in the manufacture of gas engines.

The only suggestion as to remedy for the defects of the American patent system which Mr. Richards is prepared to make looks to the imitation of the essential features of the German system, in which the basis of patentability is found in "technical results." It is to be regretted, perhaps, that any discussion of the subject is necessarily to a great extent academic. The evils of our system are hedged round by all the safeguards which some 3000 registered patent agents can devise. Inventors do not know what they want, Congress is indifferent to the whole subject, and the representatives of aggregated capital are shrewd enough to see that any change in the system would operate to their disadvantage in making it harder than it now is to appropriate property in inventions.

The Development of the Central West.

One of the causes of the prosperity of the Central West, which proved such a source of satisfaction during the trying times of last year, is the diversification of industry. Within the memory of middle aged men the country west of the Mississippi River was not only almost exclusively agricultural, but nearly every farmer was a one-crop man. The northern part of the Mississippi and Missouri valleys was given over to spring wheat. The central section was almost wholly dominated by corn. The southern territory scarcely recognized anything but cotton as worthy of attention. Most of what was raised had to be shipped to distant markets, the local consumption being light. Whenever growing conditions were propitious and markets were favorable the one-crop farmer was amply rewarded for his labors and was a heavy buyer of manufactured products. But it would frequently happen that either the markets were overstocked or growing conditions were unfavorable, when the farmer barely made both ends meet and his purchases were limited. It was necessary for his welfare that he should both be able to raise a good crop and to sell it. There were times when granaries were full to bursting, but prices were so low in the distant markets that produce could not be profitably moved from the farm. Blessed with too great plenty the farmer was unable to derive any advantage from it, and manufacturers felt the loss of his purchasing power. Thus the West for a long period experienced alternations of prosperity and deep adversity, sometimes absorbing manufactured products with an appetite that could scarcely be appeased and at other times buying very sparingly.

It is, perhaps, too soon to claim that these conditions have permanently changed, in view of the fact that so recently as 1893 to 1897 the West passed through a period of large crops and low purchasing capacity. Nevertheless, there is good ground for the belief that this section of the country has made such substantial progress from

its dependence on single crops that it can be relied upon steadily to contribute toward the nation's material prosperity. Its agricultural resources will continue indefinitely to be its main reliance, because it possesses such a vast area of arable and well watered land. But instead of depending upon single crops the farmers of that fertile section have learned to give attention to the cultivation of mixed crops and the raising of other income bearing products, as greatly needed as cereals and cotton. The cities and towns have grown rapidly with the development of the country and are affording steadily increasing local markets for the consumption of agricultural products. Further than this, however, is the influence being felt of the development of manufacturing industries and the utilization of nature's mineral treasures. The growth of manufacturing interests in that section has been marked by peculiar experiences. The factories which have been most flourishing are, of course, those which have been founded with the view of meeting the requirements of agriculture. Next come those whose products are most readily bought by people living isolated lives on farms. Unsuccessful ventures have been made in these lines by Eastern manufacturers, who foresaw the growth of the West and were convinced that the time would come when factories in that section would not only be necessary, but, if established, would capture the local trade. They either started in prematurely or began operations on too extensive a scale and were unable to get sufficient business to sustain themselves. But while they failed, others, and mainly Western men, began to manufacture in a small way and grew with the development of the country. To-day the entire section, from the Canada border to Texas and from the Mississippi to the Rocky Mountains, is alive with industrial interests which play a very important part in sustaining the agriculturists. In fact, the industrial interests are growing so rapidly that agriculturists have of late seriously felt one of the effects of industrial activity, which is the scarcity of labor. It is said to be almost impossible to keep men on the farms in numerous localities, owing to the higher wages offered by local manufacturing enterprises. This is always the effect produced upon an agricultural community by the introduction of manufacturing industries. But while the farmer may feel some pinching in that respect, he is undoubtedly benefited in others. His inconvenience in that respect is certainly of small consequence as compared with other benefits received.

The statistical methods of our British cousins seem to need modernizing. Figures for the production of pig iron, Bessemer steel and open hearth steel by Great Britain for the first half of 1903 have just been given out by the British Iron Trade Association. It would seem that a country with so small an area as that of the United Kingdom should be able to know within a few weeks after the termination of any period what its output of these primary products had been in that time. Through our columns, as derived through our own sources of information, the American iron trade knows within two weeks after the close of every month what the production of pig iron was in that month. Less than two weeks after the new year opened we gave the figures for the expired year. For exact statistics, the report of the American Iron and Steel Association, which is due in a few days, will of course take precedence as authority, but for commercial purposes the trade is already well informed as to what was accomplished in 1903. Germany does well also, the figures for 1903 having been given out this week. Judging from the record made for the first half, it will not be possible to make even a close guess at the British pig iron production for the year until after the opening of next July.

The Growth of Public Expenditures.

The financial statement which the Secretary of the Treasury laid before Congress at the beginning of this session showed a rapidly decreasing surplus and a deficit in the next fiscal year if all the money asked for by the heads of departments should be voted. As the appropriations are always a good deal less than the departmental estimates, this threat of a deficit was not a serious matter in itself. The statement, however, is important because it points to considerable changes in our fiscal system that will have to be made in the near future.

For many years the United States has been the envy of all European finance ministers, for with growing wealth, population and prosperity, and a small and almost stationary army and navy, our public revenues were not only in excess of our needs, pretty liberally estimated, but they tended to increase faster than our national expenditures. Fourteen years ago the surplus was unwieldy in spite of heavy reductions of the bonded debt, and the McKinley tariff was enacted to reduce the revenues and eliminate the growing surplus. It was extremely successful, mainly through the remission of the sugar duties. Just as the last of the surplus was disappearing under the operations of this law, silverism and some reckless speculations precipitated the panic, and there followed several years of depression, due partly to continued silver agitation, partly to events here and in Europe in years preceding 1893, and partly to unfavorable agricultural conditions that prevailed for four years.

Just as we began to recover from the depression came the Spanish war with increased expenditures, some borrowing and an increase of taxation, a part of which remained until less than two years ago. For a dozen years, then, abnormal conditions have affected the receipts and expenditures, but now we have settled down to what we may hope is a prolonged period of peace and prosperity, with the public income and outgo uninfluenced by war, depression or currency delusions.

With this resumption of normal Treasury operations we find that we are no longer in the single class of nations which we composed before 1890, the class whose income increased faster than its expenses, but that we have joined the class which embraces pretty much all other nations, the class of nations whose expenses tend constantly to outgrow their receipts. Our army is a good deal more than twice as large as it was before the Spanish war, and it costs more to keep a large force in the Philippines than to keep a like number of soldiers at home. Our navy is costing five or six times as much as it did some 20 years ago, about the time the building of the new navy began. A large amount will be spent every year for new vessels. A plan is now preparing that will provide for the expenditure of $500,000,000 during a series of years. Of course other expenses are increasing. It is very definitely stated in dispatches from Washington that a service pension bill is to be brought forward immediately. No one knows what expense it will involve. The Commissioner of Pensions has made an estimate but it is not given to the public. A Senator who, on party and geographical grounds, cannot be assumed to be friendly to the project, estimated that it would cost $40,000,000 or $50,000,000 the first year. Sharp retrenchment in other directions is said to have been decided on in order to leave money for this purpose.

Of course it would be premature to speculate about higher taxes or new sources of revenue. They will not be needed for a year or two in any event. Some curtailment of expenses may be found possible. With the increasing business of the country both customs and internal revenue increase, and they may grow in the future faster than the Treasury estimates. But, in all probability, we have now permanently joined the nations whose expenses, largely on account of their armies and navies, are constantly tending to outrun the normal revenues. The first change that should be made is in Congressional committees. We alone among nations have been able to get along without a Budget Committee. We alone have been so rich that we could be extravagant. Once we were poor and had the equivalent of a Budget Committee. Then the House divided revenues from expenditures in apportioning the work of committees. Next, one or two favored interests, for the avowed purpose of getting more money, got their appropriation bills away from the General Committee and had them assigned to the Committee on Agriculture and the Committee on Rivers and Harbors, for example. Finally, some 15 years ago, when the surpluses were so large that no one cared much how the money went, about half the remaining bills were taken away from the General Committee and distributed among half a dozen committees, not one of which has to provide the revenues it proposes to disburse, not one of which is responsible for the aggregate expenses of the Government, and every one of which, therefore, struggles to get all it can for the only branch of the public service in which it is directly concerned.

Of course, economy is almost impossible under such a system, and while the gentlemen in Congress cling tenaciously to chairmanships and influential committee assignments, the money bills will have to be concentrated and considered in connection with the tax bills, if the fiscal problem shall be, as it promises to become very soon, not the disposition of the surplus, but the avoidance of a deficit.

Cotton passed the 15-cent mark on Friday of last week, as compared with a trifle over 9 cents in August. The advance in the price of cotton is one of the most remarkable developments of the time. When it began its upward movement, the rise was credited to speculation pure and simple, but the maintenance of the high level of values has shown that those who were mainly instrumental in marking up the price had been wiser than others in forecasting the cotton situation. Mills were recently reported to be buying cotton for next summer's delivery at 14 cents, although they insisted they could not afford to buy it when it was quoted at 11. Cotton has been selling at very low prices for a long period of years, and growers now hope that the upturn will not be of brief duration, but continue long enough to requite them amply for their patience and long suffering. The wheat growers went through a similar experience of protracted poverty, but have since had six years of prosperity. If this should be the pleasurable fortune of the cotton growers, the South will be a most inviting field for business enterprise.

The Iroquois Theatre fire in Chicago has led to a general quickening of public conscience in the matter of fire escapes, sprinkler systems and fire protection generally, and a large number of property owners who have heretofore avoided or neglected to conform with the city ordinances in regard to fire escapes and elevator shafts are now either voluntarily, or because of awakened public sentiment, installing such protective devices.

The Scotch and Northern England Iron Trade.

The Cleveland Output.

GLASGOW, January 14, 1904.—Following up my report on the pig iron industry of Scotland for 1903, I am now able to submit estimates of the production in Cleveland. For some years the smelters there have refused to make any annual return to the trade of their output and stocks, and these figures are only to be obtained by a process of inductive reasoning and such information as one can collect from people on the spot.

The broad facts in evidence are that Cleveland warrants reached as high as 53 shillings ½ pence in 1903 and as low as 41 shillings 6 pence, with an average for the year of 46 shillings 4 pence. At the end of December the stock of Cleveland ordinary iron in Connal & Co.'s warrant stores at Middlesbrough was 99,953 tons, and of hematite 300 tons. As to the output it must be explained that the Cleveland smelters use both native ore and about one-third of all the foreign ore imported into the United Kingdom. These imports last year were greater than in the two previous years, notwithstanding the dulness in hematite, and Cleveland smelters received 2,185,997 tons of it, including not only the usual Bilbao qualities, but also a considerable quantity from Sweden. This is the largest import of ore since 1899, but 1894 was the record year. The output of the Cleveland iron mines was 5,500,000 tons. There were more furnaces in operation overhead in 1903 than in 1902, and the average I place at three more, say at 81 as against 78. By the improvements which have been effected in the furnaces and the more constant working they get now, there is reason to believe that the product of the smaller number in 1903 was pretty nearly equal to that of the larger number in 1900. Then, again, a larger proportion was on ordinary than on hematite, and furnaces on ordinary iron make a higher average return. The usual average used to be 500 tons of Cleveland iron per furnace per week. It is now about 700 tons, perhaps rather more, as several of the furnaces now turn out 1000 tons each per week.

On the basis, then, of the iron ore sent into consumption, of the furnaces in blast during the year, and of the improved capacity of the furnaces, I estimate the output of the whole of what is known as the Cleveland district in 1903 at 3,100,000 tons, of which about 1,000,000 tons was hematite and the rest ordinary basic and spiegel iron. The largest production was in 1899—viz., 3,251,396 tons. The make of hematite is declining in the Cleveland district, as steel can now be made from the Cleveland ores. The stocks in the hands of the Cleveland smelters at December 31 are estimated at 30,000 tons. This is an increase of 10,000 tons, against a decrease of 31,700 tons in the warrant stocks. The net decrease is 21,700 tons, which, added to the output, gives a total of about 3,121,000 tons as the local consumption and exports.

The Glasgow Market.

Since the new year holidays the Glasgow pig iron warrant market has done only a limited business, owing to the war rumors from the East. Cleveland warrants, which have, as usual, been chiefly dealt in, are 42 shillings 5 pence. The following are current quotations for the various Scotch brands:

	s.	d.		s.	d.
Coltness, No. 1	72	0	Eglinton, No. 1	52	0
Gartsherrie, No. 1	59	6	Clyde, No. 1	59	0
Summerlee, No. 1	60	0	Carnbroe, No. 1	52	0
Calder, No. 1	59	6	Monkland, No. 1	51	0
Langloan, No. 1	70	6	Glengarnock, No. 1	58	6

An incident of the week has been the arrival here of a cargo of pig iron from Sydney, Nova Scotia. This is the first for a long time from that region, but more is on the way. I suppose we shall now get all the metal that Nova Scotia cannot place with you.

Other Districts.

In the Barrow district there is a very quiet tone in hematite, and business is slow both for prompt and forward deliveries. Scarcely any forward sales can be negotiated. Stocks of iron are, however, smaller than had of late been supposed. Makers have only about 15 furnaces in blast, but this month four furnaces which

have been damped down at Barrow will be restarted. In the corresponding week of last year 33 were in blast. Prices are quoted at nominal rates only, mixed Bessemer numbers being at 54 shillings 6 pence, net, f.o.b. The steel works, which have been idle for three weeks, restart about the 18th of this month, with some new orders for rails and plates, but it is not probable the works will be kept busy.

In the Northwest district generally business in the iron trade opened for the year with a little steadiness, though the buying which appeared prior to the holidays has, perhaps, not been kept up. Here and there holders with iron at low figures are prepared to cut current rates to secure business, but with makers there is no appreciable giving way. In forge qualities of pig iron list basis rates were not advanced when foundry was put up last and there has been a fair amount of buying. In the finished iron trade the opinion is entertained by some that prices have now got down to a practicable business basis, and that the outlook, if anything, is more satisfactory, yet most of the Lancashire forges are but indifferently off for orders. In the steel trade there is a tendency to stiffen somewhat upon the low quotations of a few weeks back for billets, but business has recently been done in German billets at £4 2s. 6d. and in American billets at £4. B. T.

To Aid the Merchant Marine.

Report of House Committee on Commission Bill.

WASHINGTON, D. C., January 26, 1904.—The House Committee on the Merchant Marine and Fisheries, which last week decided to make a favorable recommendation upon the Gardner bill, authorizing the appointment of a commission to investigate the desirability of extending Government aid to the American merchant marine, has filed a formal report upon the bill, together with an amended measure which provides for a commission made up of five Senators and five Representatives, to be appointed by the presiding officers of the two Houses, respectively. It is assumed that these members will be selected from the committees having jurisdiction over the general subject matter. Chairman Grosvenor, of the House Committee, gives assurances to the friends of the commission bill that arrangements can be made for its consideration by the House within the next 30 days, probably in an interval between the appropriation bills which are now being rapidly brought forward. The opponents of the bill propose an alternative for the commission in the form of a joint resolution authorizing a system of discriminating duties, a proposition that will probably have a considerable following among minority members of the two Houses.

Chairman Grosvenor's Report.

The report of the House Committee on the commission bill, as submitted by Chairman Grosvenor, is a model of terseness and presents a summary of the various projects for the rehabilitation of the American merchant marine that have been considered in recent years. The report is in part as follows:

"We flatter ourselves justly that we are a leading nation in all that makes a nation great, and yet we are a subservient nation and a helpless nation in one of the great factors of national wealth and national independence. Other nations carry our products to the markets of the world. In the fiscal year 1902, of the total of imports and exports from Europe and to Europe, the enormous sum of $1,472,591,921, only 3¼ per cent. was carried by American vessels, and had it not been for the presence and existence of the American Line, sustained by postal subsidy, the total of our trade with Europe carried under the American flag would not have exceeded one-sixth of 1 per cent.

"But this commerce came into the United States safely and abundantly provided for by the great zeal we have manifested in making our harbors deep with water and secure with lights and all the appurtenances and appliances for safe and speedy navigation, and practically, as has been shown, all of it inured to the benefit of foreigners. For the carrying of that trade we paid, during that same period of time, nearly $200,000,000 for freight, paid to the foreigner, paid for the interest on foreign investment in ships and paid for the labor of foreign workmen. The $200,000,000 was taken out of the pockets of the people of the United States, where it belonged, and where it could easily be lodged and carried away and distributed among the various industrial features of Europe. While this is going on we are not increasing in our relative position in the world. We are growing in production and diminishing in carrying power. We are growing in the demand and necessities for markets, and we are shrinking in our ability to seek markets.

Urgent Necessity for Action.

"The necessity for some action is made startlingly manifest by the testimony of shipbuilders and shipowners who have appeared before this committee, and it may be said, with propriety, that the committee is unanimous in the opinion that some action should be taken by the Government in this important crisis; but in this case, as in nearly all cases involving matters of so much importance, there is a difference of opinion as to what the remedy ought to be. It may be said that there are radical differences of opinion among public men, and even among those who have given their most earnest attention to the subject, as to the things that Congress ought to do in this behalf. One proposition, which is being urged very strongly and which has the support in the platforms of both parties, is a recurrence to the ancient provision for discriminating duties. It is sufficient for the purpose of this report to state that, in the estimation of a large body of intelligent students of the subject, that remedy is impossible of application without enormous injury to our foreign trade, an injury, too, at a time of all other times when our situation in the matter of foreign trade is the most delicate and the most endangered.

"It is sufficient for the present purpose to say that the adoption of discriminating duties in favor of American ships, while it would be ineffective, inasmuch as we are not prepared to carry a tenth part of our foreign commerce in our own ships at this time, would so disturb our relations with foreign countries as to produce paralysis, if not panic, in our business. But, however this may be, there is a wide difference of opinion as to the right thing to be done.

"Then comes the proposition of free ships, by some believed to be a deadly blow at the whole doctrine of protection, and by others upheld and advocated because of that very fact, and then comes the great variety of opinion as to the essential points in dispute. If there is to be aid at all given by the Government, shall it be in the form of subsidy upon tonnage or subsidy upon the carrying of the mails, or in what form and under what system shall this aid be given? Therefore, while all intelligent and patriotic men apparently believe that something ought to be done, there is a wide divergence upon what and how.

The Commission Plan.

"Realizing all these difficulties, the committee has decided to ask Congress to authorize a commission composed of Senators and Representatives to be selected by the presiding officers of the two houses, authorized to sit during the session and during the vacation, and be ready to report, on the first day of the short session of this Congress, the opinion of such commission as to the proper steps to be taken. It may be said that everything that can be known is known now. That is hardly a fair statement. Until the last few months there has been utter indifference manifested about this whole subject in a great section of the United States, and the people of that section, the interior of the States west, are beginning to be interested by this legislation. The people in the west and interior of the country seem to have been taught that this whole scheme was a scheme for the enrichment of the few, and that the great public had no interest in it.

"That sentiment, fortunately, is rapidly vanishing, and strong appeals to the committee to take action have come from the boards of trade at Denver, at Topeka, and other points in the Great West and Middle West. So it is believed that this commission, if authorized by Congress,

can, without any considerable expense, take the views of distinguished and prominent and intelligent men of all shades of opinion and bring to the knowledge of Congress a statement of facts and a compilation of information that will aid Congress greatly in the discharge of a duty that seems at this time to be absolutely imperative. It is therefore recommended that the bill be amended as suggested and passed."

The minority members of the committee will submit their views in the course of a few days advocating the discriminating duty plan. It seems probable, however, that as the commission is authorized to investigate this plan as well as all other projects for the aid of the merchant marine, the pending bill will receive numerous minority votes in both houses.

Coastwise Laws for the Philippines.

A hearing was given by the Senate Committee on the Philippines on the 21st inst. to the advocates and opponents of Senator Frye's bill extending the coastwise laws of the United States to the Philippine Islands after July 1 next, which would have the effect of restricting the carrying of freight and passengers between the United States and the Philippines to American vessels. The bill was opposed by representatives of cordage manufacturers, who claimed that its passage would eliminate from the trade the competition necessary to keeep freight rates down to a resonable point, and would transfer the hemp trade to London, where it centered prior to the opening of the Philippine ports. Other witnesses expressed doubts as to whether there were now in existence sufficient vessels to do the current freight business between the Pacific Coast and the Philippines, and suggested that if more vessels were withdrawn from the Atlantic Coast for this purpose Eastern shippers sending goods to Europe would soon be obliged to pay higher rates.

Samuel S. Sewall of Arthur Sewall & Co., ship builders, of Bath, Maine, and W. L. Marvin, representing the combined shipping interests, declared there were plenty of ships to take care of the business, and that the competition between American vessels running independently and those operated in connection with transcontinental railroads would prevent excessive rates. Other witnesses were James Jerome of New York, president of the Michigan Steamship Company; Edgar F. Luckenbach of New York, and Geo. S. Dearborn, president of the American-Hawaiian Steamship Company, all of whom favored the measure.

The Frye bill has already been favorably reported to the Senate, the hearing on the question having been given as a matter of courtesy to enable the opponents of the measure to present their views, but nothing was adduced at the hearing calcuated to delay the committee's program, which is to pass the bill through the Senate at an early date.

W. L. C.

James Corrigan of Cleveland, Ohio, has ordered from the Electric Launch Company of Bayonne City, N. J., a large gasoline cruising yacht. Her length over all will be 95 feet, the beam 16 feet and the draft at propeller wheel 4 feet. The power equipment of the yacht consists of a 200 horse-power, six-cylinder Standard marine engine, self starting and reversing. Seventeen and one-half miles is the speed expected. An electric plant will be supplied, with storage battery, furnishing lights throughout the cabin and staterooms and a powerful searchlight on the pilot house. The tank capacity will be 2000 gallons of oil, stored forward and aft, which the builders say will enable the boat to cruise 2000 miles. Two tenders will be supplied, one being equipped with an engine of 1½ horse-power. Mr. Corrigan intends to use the yacht on the Great Lakes and the St. Lawrence River, and contemplates making a special trip to the St. Louis Exposition during the coming summer. The boat will be ready for delivery on April 15.

Officials who have in charge the awarding of contracts for the construction of the Pennsylvania Railroad tunnel, under New York and the adjacent rivers, while generally satisfied with the bids received, found that the bids on one section of the work were not up to expectations. While some modifications will be asked, in order to bring some of the bids within the required specifications, it is now expected that the changes necessary will be completed so that awards can be made before February 15, which is the final day for the awarding of contracts.

Lake Superior Copper Production.—Lake Superior copper production for last month was the largest ever secured, with one exception, amounting to 17,325,000 pounds. This is at the rate of 208,000,000 pounds a year. There is no accumulation of copper on the lake, as rail shipments equal production. There should be a further growth by spring. The Champion, which is really the biggest of the flotations following the boom of five years ago, is now stamping 1400 tons of rock daily, and will have two more stamps working by summer, giving it 600 tons additional capacity. Its rock is averaging 30 pounds of copper to the ton, and there is but one mine in the lake district, the Calumet and Hecla, that does better. The Osceola Company will increase its output slightly, and the Mohawk will add 50 per cent. to its production. The Champion has about 30,000 feet of openings. The fourth level is opened 5000 feet in length, and E shaft is 1104 feet deep. The mine is operating 54 drills, and is installing a 100-drill compressor plant, which should be in operation by spring. Its daily production of rock from that time until a fifth and sixth stamps are installed should be about 2000 tons. Mohawk mine will start its third stamp this week, and No. 4 shaft will commence producing. This will add 50 per cent. to the mine's production. At the Calumet and Hecla they have been sinking No. 19 shaft to test the Kearsarge lode, and at the depth of 95 feet struck into it January 21. It is well charged with copper, and is very encouraging for further development.

Standard Tin Plate Company.—The new plant of the Standard Tin Plate Company, at Washington, Pa., is about completed, and is expected to start in full operation on February 1 or shortly after, giving employment to between 350 and 400 men. The plant embraces five hot mills, six sets of cold rolls, two pickling machines, two annealing furnaces for white annealing, one annealing furnaces for black annealing, while the tin house contains 10 stacks. The plant contains a bar mill for breaking down billets into sheet bars. It is commanded by a 5-ton Morgan electric traveling crane, while the heating furnaces are commanded by a similar crane. The annealing house is a brick building, 80 x 240 feet, and is commanded by a 15-ton Morgan electric traveling crane. All the rolls were furnished by the Mesta Machine Company of Pittsburgh, while the tinning machines, branners and polishers were furnished by the Anderson Machine Company of Anderson, Ind. The boilers were furnished by the Erie City Iron Works, Erie, Pa. All shafting is under the floors, and natural gas is used for fuel. The officials of the Standard Tin Plate Company are E. Jeffries, president and general manager; J. V. H. Cook, treasurer, and C. C. Johnson, secretary. The output of the plant will be tin and terne plate, and will amount to about 5000 boxes a week, running double turn.

In a summary of the career of Christopher Hotz of Chicago, published in *The Iron Age* January 21, page 29, the statement was made that he turned over his first business "without consideration to Fred. Wolf, one of his draftsmen." We are advised that this is not strictly correct. Fred. W. Wolf, after attending college at Karlsruhe, came to this country and with a letter of introduction called on Mr. Hotz. During the conversation which ensued Mr. Wolf bought Mr. Hotz's business for $153, including office fixtures, good will and all. Mr. Wolf was not one of Mr. Hotz's draftsmen. He was never in the employ of any one and has always been in business for himself.

The Massachusetts Labor Commission.

The report of the special Massachusetts commission, which has been considering the entire subject of the relations of employer and employee, contains a number of interesting recommendations and discussions in addition to those on the Workingmen's Compensation Act, already alluded to in *The Iron Age*. The conclusion reached as to the question of assignment of wages, concerning which there has been much discussion in many of the States, is that there should be legislation to prevent an assignment of wages for more than two years, or under a future employer, or unless executed in person, and must be for a debt contracted prior to or simultnaeously with the execution of the assignment.

Those who have had experience with the workings of the usual law for governing the assignment of wages will quite agree with this recommendation, for the abuses of the law have had many serious examples. The "no money down" concerns will be robbed of some of their grasp on their victims, and so will those concerns that advertise to loan money to salaried people without security. Anything that will strike these evils will be welcomed by employers who have been annoyed thereby because of personal inconvenience, and who have had their sympathies aroused by the state of almost slavery into which employees have put themselves by assigning their wages for unlimited periods as security for money loaned or goods purchased. It is possible, under present laws in most States, probably in all States, for a man or woman to tie up his or her wages for years, to secure the payment of principal of the debt and, far more serious, of usurous interest, which generally soon exceeds the principal.

Attachment and Assignment of Wages.

If the law should be changed as proposed it would do a good deal to drive the "No money down" and other similar people out of business. The commission says of this in their report:

> The difference between an attachment of wages and an assignment of wages is that an assignment is a supposed voluntary act of the employee, while an attachment is a compulsory process against the employee's wages by means of a trustee writ served upon his employer. So far as the trustee process is concerned, we do not think it has become subject to any general abuse. We are not prepared to recommend a change in the present Massachusetts law on this subject, which allows an exemption of $20, reduced to $10 if the claim is for necessaries of life.
>
> In regard to the assignment of future wages, a different state of things presents itself. It may be promised that the right to assign wages as yet unearned is a power under the common law, not arising from any statutory provision. It is, however, held by the courts that wages to be earned under future contracts are not capable of being assigned (Herbert v. Bronson, 125 Mass., 475, 476).
>
> The evidence presented to the committee leaves no doubt that abuses have arisen in Massachusetts in connection with the assignment of wages which call for legislative interference. The right and duty of the State to intervene in this matter are increased by the fact that the present system nullifies to a considerable degree the law requiring weekly paymnts to the greater number of wage earners of the Commonwealth. For the prevention of the hardship and oppression, easily possible under the present system, and in support of the weekly payment law in letter and in spirit, we urge the enactment of the bill which follows. In brief, the proposed legislation requires that the assignment shall be executed in person by the assignor, and not by attorney, and shall run for a period not exceeding two years, and must be for a debt contracted prior to or simultaneously with the execution of the assignment.

Injunctions.

As to the question of injunctions the commission are not united on the general statements contained in the report. The blanket injunction is condemned, however, by the majority, Messrs. Sterling and Osgood dissenting. The report on the subject says:

> Among the subjects upon which we have been called to report is the use of injunctions in industrial disputes. On the one hand it is asserted that the writ of injunction is a valuable remedy, as the ordinary processes of common and statutory law do not meet the fundamental evils occasioned by a strike; while on the other hand it is charged that, through the use of such writs, the rights of workmen are attacked, and that the country is in danger of government by injunction.
>
> The general testimony, as gathered from Massachusetts clerks of court, is that there is a growing inclination on the part of our courts to guard more carefully the issue of injunctions in strike cases, and to scrutinize more critically the phraseology of such injunctions. The two propositions which tend to change the power of the courts as now constituted are, first, that no injunction shall be issued in the case of an industrial dispute (see House, No. 870), and, second, that no restraining order shall be issued which does not specifically name the parties to be enjoined (blanket injunction).
>
> We do not regard with favor the proposition that any class of persons or interests within the Commonwealth shall be exempt from the just orders of a court of equity. Such exemption runs counter to the constitution of the Commonwealth, as expressed in section VI, article I.
>
> With the so-called blanket injunction we have no sympathy, nor do we believe that they should have a place in the equity procedure of this State. Certainly no person should be punished for contempt not committed in the presence of the court, unless he is a party to the suit, or the agent of a party, or has been personally served with a copy of the injunction order. With this end in view, we submit the following bill:
>
> No restraining order or injunction shall be issued against any person, association or corporation not named as a respondent in the same, except that when such order or injunction issues against an association or corporation or individuals named it may be issued also against the officers, agents, attorneys and members of such associations or corporations, or against the agents or attorneys of such individuals, without naming the parties so designated.
>
> In one particular we believe that the present law (relating to contempt) is defective. If a person be punished for contempt of court because of an act afterwards adjudged to be a crime, he is now subject to such penalty as the court may assign for the contempt, and, in addition, to a subsequent penalty for the crime. We believe that the powers of the court will in no wise be weakened, and that much and bitter misunderstanding of the object of an orderly government will be removed if but one punishment be administered. Any person so convicted should have his punishment for the crime diminished by the penalty suffered by him for the contempt. (Accompanying bill.)
>
> If the conduct of trade disputes could be disassociated absolutely from intimidation and threats, we believe it would be public policy to abandon the common law principle of conspiracy as applied to such disputes. A strike may injure the employer, but this ought not necessarily and in itself to make the acts of the workmen unlawful if otherwise innocent, provided the main object of a strike is to improve the condition of the workmen concerned.
>
> We recognize, however, that the ordinary processes of law frequently do not meet all of the real evils in case of a strike, and that intimidation and threats, while now punishable under the law, cannot always be satisfactorily proved before the courts. We are not, therefore, prepared to recommend the passage of so radical a measure as House, No. 870. There is an element in the law of conspiracy, as applied by courts of equity in industrial disputes, which needs to be preserved; and, while it may be admitted that judicial interpretation of the law is uncertain and even inconsistent, we believe that it is for the interest of society to proceed slowly, along more conservative lines.

The general findings of the commission of general interest, outside of Massachusetts as well as in that State, as summed up by the commission, follow:

The Findings of the Commission.

1. Against compulsory profit sharing or voluntary profit sharing under State supervision and control.

2. Against a court of compulsory arbitration, but in favor of legislation enlarging the powers and duties of the State Board of Arbitration and Conciliation.

3. Against change in the law for attachment of wages, but providing legislation to prevent assignment of wages for more than two years or under a future employer, or unless executed in person.

4. *a.* State Board of Education should investigate and report upon feasibility of increasing compulsory school age to 15 years, and, if favorable, child labor under that age should be prevented.

b. Favors extension of restriction of employment of minors.

c. Illiterates under 16 to be excluded from gainful labor.

d. No children under 16 to be permitted to engage in gainful labor between 7 p. m. and 6 a. m.

e. No legislation restricting hours of child labor until Board of Education makes report.

f. Fifty-eight hour law in mercantile establishments to be amended to cover month of December.

g. No legislation on Saturday half holiday.

h. Tenement house ("sweat shop") labor to be registered monthly.

i. State Board of Health and Bureau of Statistics of Labor should investigate dangerous occupations.

j. State police force should be increased.

5. *a.* No amendment to Employers' Liability Act.

b. Employees' Compensation Act should be passed, by which injured employees shall receive compensation from the employer for injuries while in service, based upon their rate of wages.

c. No compulsory pension fund.

6. *a.* No legislation on "blacklisting."

b. Present statute on "intimidation" is sufficient.

c. No legislation on "boycotting."

d. (Majority report.) No "blanket injunction" to be granted: penalty for contempt to be deducted from punishment for crime when both are of the same nature.

e. (Minority report). Mr. Sterling dissents from reasoning on injunctions. Mr. Osgood favors an act permitting peaceful persuasion and legalizing acts of labor unions where such acts would be permissible to individuals.

Lake Mining Matters.

The Question of Ore Prices.

DULUTH, MINN., January 23, 1904.—There is little talk of ore prices for the coming season, but mining men are up in arms against the suggestion that rates be cut $1 a ton. They would not complain so bitterly of a 50-cent cut from last year, or a change in the differentials between Bessemers and non-Bessemers or Mesabas and Old Range ores, but a change of $1 flat is more than they feel they need to accept.

A Little Labor Trouble Brewing.

Signs of a minor labor trouble are in the air. Steam shovel engineers and cranesmen were gathered into the national union of dredge and steam shovel men last year, and letters from headquarters received here the past few days are to the effect that none of the union men will be permitted to work at the scale that has been talked of among mining people, employers and employed, here this winter. The union also proposes to enforce some rather drastic provisions as to work, which cannot very well be acceptable to employers. Most of the steam shovel operators in this district have been trained to their present work right here, and no great time or trouble has been experienced in training them, and it really matters very little except to themselves whether or not the steam shovel men go to work or not. The companies, of course, would far rather have their old men again, but they will probably make no effort to avert a walkout, and will soon pick up what few men are required to carry on this branch of the industry. It is very sure that none of the mining companies are willing to stand any foolishness or to concede much in the way of pay this year; conditions do not permit it and the stocks of ore on hand make it unnecessary.

The Mesaba Range.

The State of Minnesota has won title to a narrow strip of land adjoining Alpena mine of the United States Steel Corporation and Enterprise of the Tesora Company. It was a sort of no-man's-land, through early errors in surveying, and was finally granted the State on the notes of the deputy surveyor, which showed it as swamp. This was contested by the Government in behalf of homestead entry men, but the general Land Office has now decided that the original minutes of the surveyor are to stand final. The land is unexplored, but may contain iron ore.

So far as concerns its place as a large operator in the Minnesota region, the corporation known as the Minnesota Iron Company have passed out, and the Oliver Iron Mining Company are now handling the United States Steel's Mesaba properties, as well as those they own on other Lake Superior ranges. The original Minnesota Iron Company were the first miners of ore in Minnesota, being the company organized by Charlemagne Tower in 1883. They owned the Soudan hard ore mine and an interest in the Chandler, Vermillion range, and when the Mesaba opened secured the Auburn, Canton, Elba, Fayal and Genoa, as well as a large tract of undeveloped lands, much of which has not even yet been developed, or even explored. Up to the date of the organization of the United States Steel Corporation the company had mined 21,000,000 tons, and owned an elaborate railway plant, the Duluth & Iron Range road.

Complete electrical equipment for tramming, &c., is being installed at Lincoln mine, Mesaba range, and the mine will reopen soon with a moderate force. The Republic Iron & Steel Company are hoisting on the Mesaba at the rate of about 700 tons a day, and will reopen their Kinney mine with the advent of spring. A little ore is being hoisted at the Crosby mine, the first property on the Mesaba of the Cleveland Cliffs Company. It will ship the coming season, over the Great Northern road. Ore is now coming out of the Buffalo & Susquehanna mine at Hibbing, which is the first of the Rogers, Brown & Co. Mesaba properties to begin active operations.

Curtailments.

Several curtailments and suspensions have been announced this week. Among them are Bristol, a Crystal Falls mine of Oglebay, Norton & Co., which cuts off most of its force of 100 men and will do no mining this winter. Picklands, Mather & Co. and the Lackawanna Steel Company close Minorea, Mesaba range: Odanah and Mikado, Gogebic range, and Caspian and Verona, Menominee range. This reduces their active mines to a small number. Rogers, Brown & Co. reduce forces at Beaufort, Michigamme, which is owned by the Niagara Furnace. However, all these mines do not make so serious a cut as appears, for the total number of men let out is but 475.

The Gogebic Range.

Atlantic mine, Gogebic range, is looking very well and development is progressing satisfactorily. About 160 men are employed and not much ore is coming out, but recently a new deposit was cut that promises well and may make the mine important. No. 2 shaft is now down 800 feet, and will be sunk 250 more before cross cutting to the ore. Work still progresses on the subsidiary formation south of Bessemer, where Captain Whitburn was recently engaged. He has left for other fields, but his associates think they will continue. Work at the new Amazon mine, west of Hurley, is under way as rapidly as possible, and it is expected that a shipper will develop there this year. Some ore will be stocked.

Notice from the Illinois Mining Company is to the effect that the Baraboo, Wis., property they were operating will resume early in the spring. This property did not, contrary to reports from Baraboo, ship any ore last fall before closing down.

Output of the Large Mining Companies.

In addition to the figures given heretofore of shipments, &c., of iron ore from the Lake Superior region, there is presented beneath the production in 1903 of the several steel making companies interested in mining and of the larger single mines, as compared with 1902. The leading producers of the year were as follows:

	1903. Gross tons.	1902. Gross tons.	Change Gross tons.
U. S. Steel Corporation.....	14,355,000	16,025,000	D. 2,570,000
Corrigan, McKinney & Co...	1,565,000	2,190,000	D. 635,000
Cleveland-Cliffs Iron Company	1,315,000	1,720,000	D. 405,000
Pickands, Mather & Co.....	1,100,000	1,270,000	D. 170,000
Penn Iron Mining Company.	1,000,000	792,000	I. 208,000
Jos. Sellwood.....	831,000	383,000	I. 448,000
Jones & Laughlin	631,000	442,000	I. 189,000
Repub. Iron & Steel Company	493,000	336,000	I. 157,000
Ferdinand Schlesinger.....	320,000	309,000	I. 11,000
Oglebay, Norton & Co.....	240,000	129,000	I. 111,000
Inter. Harvester Company..	216,000	.....	I. 216,000

In this list the United States Steel Corporation are not credited with any part of the production of Mahoning, Pewabic, nor Union, though they have an important interest in them all, and one that would increase their aggregate by 780,000 tons. On the other hand, their figures do include all of Lake Superior, Marquette range, and Regent, though a 25 per cent. interest in both is owned by the Cleveland-Cliffs Iron Company. The Penn Iron Mining Company are credited with half of Mahoning, which they own, and with all of Republic, which was not on their list for 1902. The figures for Pickands, Mather & Co. include all of the Lackawanna Steel Company's operations, but not any of Cypress, which is owned jointly by them and Jos. Sellwood. The Republic Iron & Steel Company are given all of Union, which they

operate, though owning but 50 per cent., and all of Clifford, but with none of Mahoning, in which they have a minority interest.

The number of mines that produced in excess of 500,000 tons in 1903 was 15; in 1902, 16; in 1901, 13. These mines, with their owners and production, are as follows:

District.	Owner.	1903. Tons.	1902. Tons.	Changes. Tons.
Marquette range:				
Cleveland-Cliffs Iron Co.	Same.	839,327	1,104,864	D. 265,337
Lake Superior Iron Co.	U. S. S.	604,829	832,796	D. 227,967
Menominee range:				
Chapin mine	U. S. S.	704,114	956,812	D. 252,698
Aragon mine	U. S. S.	522,035	646,203	D. 124,168
Gogebic range:				
Norrie-Pabst	U. S. S.	790,269	1,080,032	D. 289,763
Vermillion range:				
Pioneer mine	U. S. S.	596,780	673,863	D. 77,083
Mesaba range:				
Fayal mine	U. S. S.	1,460,815	1,919,172	D. 358,357
Mountain mine	U. S. S.	1,342,697	1,421,456	D. 78,759
Adams mine	U. S. S.	1,109,798	1,242,923	D. 133,125
Stevenson mine	Corrigan.	1,010,582	1,434,681	D. 420,099
Biwabik mine	Tod.	807,581	623,127	I. 184,454
Burt mine	U. S. S.	631,147	.....	I. 631,147
Lake Superior group	U. S. S.	593,962	766,311	D. 172,349
Spruce mine	U. S. S.	585,815	543,203	I. 42,612
Mahoning Ore & Steel Co.	Same.	1,010,338	1,038,645	D. 28,307

Of mines that produced between 250,000 and 500,000 tons there were 13 in 1901, 10 in 1902, when they increased to a greater output, and 13 again in 1903.

Burt mine, Mesaba range, is a new property, which was not opened for mining until midsummer of the past year. That it has been able to ship as much as it did is an interesting comment on the possibilities of opening and mining rapidly from steam shovel properties. The Burt had been until the past year a small shipper from underground, and a minor part of the Lake Superior group. The mine might as well have produced 1,000,000 tons in 1903 as 630,000, had there been demand, and it was fully intended that it should do so.

Most of the larger shippers of the Mesaba range are open pit mines,though by no means all of them are. Fayal and Adams secure most of their product underground, though were they to be reopened to-day they would probably be stripped. Lake Superior and Spruce are entirely underground. Mountain, Stevenson, Biwabik, Burt and Mahoning are the only exclusively surface properties among the larger shippers. All the large shippers of the old ranges take their ore from underground.

The production of the largest underground mines of each range since their inception to date has been as follows: Norrie, Gogebic range, 13,860,119 tons; Cleveland Cliffs, Marquette range, 12,308,463; Chapin, Menominee range, 11,960,527; Chandler, Vermillion range, 8,154,164; Lake Superior, Mesaba range, 2,914,481.

The Cleveland Cliffs Iron Company have been extremely fortunate in a splendid discovery in Negaunee mine, which they are developing for a larger production than before. It looks as though the tonnage in sight in this mine might be very greatly increased by the new find, when sufficiently developed. D. E. W.

The maximum boiler horse-power in central power stations is only attained during a few hours of the day. During the greater part of the day the capacity required is much less than this maximum. On this account it has been found economical and practical to design the boilers and chimneys of ample capacity for this load and to force them above and up to the maximum by means of mechanical draft. This is applied with equal success to old and new plants. In the new power station of the Denver Tramway Power Company, Denver, Col., mechanical draft is used as an auxiliary to the natural draft provided by a chimney 240 feet high. Artificial draft is furnished by three Sturtevant electrically driven steel plate fans. The boiler capacity of the plant is approximately 6000 horse-power.

On January 21 the breaking of a belt was the primary cause of the bursting of a 50-ton fly wheel in Merchant Mill No. 2 of the Cambria Steel Company, Johnstown, Pa., wrecking the mill building, killing three men and injuring a score of others.

Notes from Great Britain.

The Markets.

LONDON, January 16, 1904.—The most important event this week has been the Birmingham quarterly meeting, and the result of its proceedings has been reductions in the price of marked bars and gas strip, with an increase in the discounts of 2½ per cent. by the Tube Makers' Association. In addition to this, the official reduction in the price of marked bars led to further pressure by consumers on the unmarked bar makers, and prices tended to shade. Nominally they were anything from £6 to £6 5s., but, as a matter of fact, for a substantial order it was not difficult to obtain £6, and possibly secure some slight consideration in addition.

This meeting being the first representative gathering of the new year of the iron and steel trades, it had points of interest connected with it apart from the actual business done. In January last year there were 354 furnaces in blast, but this year the number has fallen to 316. Against this, however, it has to be borne in mind that most of the newly built furnaces are of larger productive power than those superseded, so that in consequence the reduction of output would not be nearly so great as this difference in figures would indicate. Then, again, January this year, compared with January last year, shows a marked reduction all round in prices. Scotch, Lancashire and North of England pigs have dropped by about 4 shillings per ton, hematite between 5 and 6 shillings, and South Staffordshire cinder pig 2 shillings 6 pence. Bar iron is at least 2 shillings 6 pence cheaper in the North of England and North Staffordshire than this time last year, and 5 shillings lower in Lancashire, South Staffordshire and Shropshire. Turning to the manufactured articles, black sheets are lower by £1 per ton, galvanized corrugated sheets by 17 shillings 6 pence, and there has been a fall of from 5 to 10 shillings per ton in steel.

Thus, whatever may be the aggregate turnover of the iron and steel trades for Great Britain during the past 12 months, it is evident that prices have been by no means remunerative. On the other hand, it may be said that if the iron and steel makers have had to reduce prices, this in its turn may have stimulated the trade in finished commodities and so tend to improvement. Thus our production of pig iron shows an advance on 1902 of over 400,000 tons, but the total output was 300,000 under 1899. It was in these circumstances that the meeting was held, and it is not surprising, therefore, that makers had to make concessions to the consumers. The reduction in the price of marked bars led to many animated scenes on the Exchange. For the guidance of American makers, it may be well if I give actual quotations of the marked bar makers. In anticipation of the quarterly meeting, the following list houses sent out new quotations, as follows:

William Barrows & Sons of Bloomfield Iron Works, Tipton, quote Crown BBH bars £8, BBH Bloomfield plates £9 per ton at works.

N. Hingley & Sons, Limited, of Netherton Iron Works, Dudley, announce, under date the 13th inst., that the price of their marked bar iron has been reduced 10 shillings per ton.

For the Earl of Dudley's Round Oak Works, Limited, Brierley Hill, George Hatton, managing director, states that their prices for both L Crown W. R-O bars and H B Crown bars are reduced 10 shillings per ton.

John Bagnall & Sons, Limited, of Lea Brook Iron Works, Wednesbury, announce that they have reduced their prices of Crown I. B. Bagnall iron 10 shillings per ton.

The recent history of the fluctuations of marked bars is of more than passing interest. The minimum price within the last few years was £7, which was in force from January 2, 1895, until December 1, 1896, when the standard became £7 10s. This held good until October 13, 1898, when the price became £8. The following year was one of the most remarkable in the history of the trade. It included the beginning of the boom, and for the number of advances was only surpassed by that extraordinary year, 1872. No fewer than five advances were announced, and the price moved up as follows: April 15, 1899, £8 10s.; July 1, £9; August 19, £9 10s.; October 7, £10; December 2, £10 10s. The upward progress was continued in 1900, another 10 shillings increase on January 1 carrying the total to £11, and a month later, February 2, it went to £11 10s., which was

the maximum. It remained unaltered until November 1, when a reduction of £1, to £10 10s., was made. Another £1 reduction ushered in 1901, the standard becoming £9 10s. on January 1. On May 1 another £1 reduction brought it down to £8 10s., and there has been no change since until the one here announced. The £8 10s. standard has therefore held good for about 140 weeks, which is almost a record length of time since 1866. Only once has there been a longer interval without alteration—165 weeks, from February, 1883, to April, 1886—when the standard remained at £7 10s.

With the beginning of the year's market activities it is desirable to quote standard and other prices, which are as follows:

Pig Iron: Scotch warrants, 49 shillings 9 pence; Middlesbrough, 42 shillings 5 pence; hematite (West Coast), 52 shillings 6 pence. Forge qualities: Staffordshire cinder, 47 shillings 6 pence; part mine, 48 shillings to 49 shillings 6 pence; all mine, 60 to 65 shillings; best ditto, 75 to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 45 shillings to 47 shillings 6 pence; Derbyshire, 47 to 48 shillings; North Staffordshire, 48 to 49 shillings; Lincolnshire, 50 shillings 1 penny.

Public stores stocks, Thursday, January 14:

	Tons.
Connal's, at Glasgow	9,204
Connal's, at Middlesbrough	101,844
Connal's, at Middlesbrough, hematite	300
Hematite, West Coast	20,232

Finished Iron: Marked bars, £8; Earl of Dudley's brand, £8 12s. 6d.; second grade, £7; common unmarked bars, £6 to £6 5s.; North Staffordshire bars, £6 10s. to £6 12s. 6d.; angles, £6 15s. to £7; sheets, singles £6 12s. 6d. to £6 15s., doubles, £6 15s. to £6 17s. 6d., trebles £7 7s. 6d. to £7 10s.; galvanized corrugated sheets, f.o.b. Liverpool, £10 10s.; hoop iron, £6 17s. 6d. to £7 2s. 6d.; nail rod and rivet iron, £6 12s. 6d. to £6 15s.; gas strip, £6 2s. 6d. to £6 5s.

Steel: Bessemer billets, £4 5s. to £4 7s. 6d.; Siemens billets, £4 10s. to £4 15s.; mild bars, £6 to £6 5s.; girder plates, £5 17s. 6d. to £6; boiler plates, £6 15s. to £7 5s.; girders, £5 15s. to £6 5s.; angles, £5 5s. to £5 12s. 6d.

It is, of course, understood that the prices quoted in this column can only be utilized as indicative of the trend of the market, and are in no way bottom prices.

The Labor Situation.

In addition to the general unsettlement of trade, labor disturbances are threatened, although as yet no rupture of any consequence has taken place. The engineering difficulty on the northeast coast still continues. Employers last week gave notice of a reduction to take effect in two months in the wages of all men skilled or otherwise employed in the engineering workshops. In the case of piecework, 5 per cent. is to come off present prices, and the wages of both skilled and unskilled weekly workmen to be reduced proportionately. From 15,000 to 20,000 men are affected by the notice. There is undoubtedly a strong disposition on the men's part to resist the reduction; but, of course, the question has not yet received full consideration by the various workmen's organizations concerned. The steel smelters in the north of England and Scotland have agreed to a 5 per cent. reduction dating from January 11. In South Wales, Baldwins' Landore Steel Works have been subjected to many stoppages of late, owing to disputes with their workmen. They are now restarting their bar mills on the old conditions, and at the present standard rate of wages, pending a general settlement in the trade. In addition to the trade depression in the districts of Barrow and Workington there are also labor disputes pending.

The Ingenuous Buyer.

W. H. McConnel, chairman of the Monmouthshire Steel & Tin Plate Company, in a letter to the *Times* explains for all and sundry how it is that Americans undersell their British competitors in the British market. These are his own words. In replying to a critic by the name of Haslam, he says:

> May I describe the process of dumping in relation to the steel bar trade in South Wales? The American importers are established in their office in London, and, in their own words, they "have come this time to stay." A customer wanting bars gets a quotation of, say, 80 shillings from a Welsh firm; he then goes to the American office and buys at 75 shillings. If the Welsh maker had been able through, as Mr. Haslam suggests, the expenditure of capital, to quote, say, 77 shillings 6 pence, the American office would quote 72 shillings 6 pence, and so on. Mr. Haslam will thus see that the competitive American price which we steel makers have now to face is not based either on the selling price in America or on the cost in America, but on the cost in South Wales; their figure is kept a little below our cost. As the Americans are only enabled to carry on this method of trade through the high protective duties in America, the steel bars they export to us are practically exported under a bounty; the price they sell at here is the cost of the bar, less some, just what they find necessary, of the extra price their heavy protective duties enable them to get in America.

The idea of the ingenuous British buyer getting a quotation from an English maker and then showing it to the American agent in London is certainly a quaint concept of the way business is done in this country, and W. H. McConnel is chairman of a steel and tin plate company of fairly large dimensions!

To Meet German and Belgian Competition.

To combat Continental competition a movement has been set on foot in Glasgow to check the increasing inroad of German and Belgian forgings and castings into home shipbuilding yards. A representative meeting of Scotch forge masters was held in Glasgow this week, and with a view to making the movement national, meetings have been fixed to be held in English centers. The Germans are underbidding home forge masters by 30 per cent.

S. G. H.

The Youngstown Iron Sheet & Tube Company.—A recent statement printed in the local papers, to the effect that the Youngstown Iron Sheet & Tube Company, Youngstown, Ohio, makers of wrought iron and steel sheets and pipe, black and galvanized, had sold their product up for an entire year is untrue. It is a fact that the company are very comfortably fixed with orders, but they reserve a large portion of their tonnage each month for current business. They have a good deal of tonnage booked for both pipe and sheets, and are running their mills to full capacity.

Schonthal Iron & Steel Company.—We are officially advised by B. E. Schonthal, secretary and treasurer of the Schonthal Iron & Steel Company of Cumberland, Md., manufacturers of light rails, that they have not joined the Association of Manufacturers of Light Steel Rails, as reported in *The Iron Age* of January 21, on page 15. They are not members of the organization.

Germany's pig iron production for 1903 was 10,085,634 metric tons (2204 pounds each), an increase of 1,682,974 tons, thus outstripping Great Britain for the first time in history. In 1902 Great Britain produced 8,653,976 metric tons and Germany 8,402,660 tons. Great Britain's maximum output was reached in 1899, when a make of nearly 9,500,000 tons was reached. Germany never made as much as 9,000,000 tons prior to 1903. The coal production of Germany for 1903 was 116,664,376 tons, an increase of 9,215,842 tons.

In the courts at Pittsburgh last week a petition was presented by the Mesta Machine Company asking for leave to intervene in the suit of the Crucible Steel Company against the Clairton Steel Company. A rule was granted on the plaintiff, defendant and the receivers of the Clairton Steel Company to show cause why the Mesta Machine Company should not be added as a party to the case. The Clairton Steel Company are said to be in the debt of the Mesta Machine Company to the extent of $5000.

The Wellman-Seaver-Morgan Company of Cleveland, Ohio, announce the opening of a Pittsburgh office, located at 515 Frick Building, in charge of Willard N. Sawyer, manager. This office is opened for the convenience of the trade adjacent to Pittsburgh. Mr. Sawyer has been with the company for a number of years, prior to which he was general superintendent of the Tennessee Coal, Iron & Railroad Company's steel works, at Ensley, Ala.

H. L. Sholly, who has been with the Tyrone Iron Company of Tyrone, Pa., for over 18 years, serving them as superintendent and general manager, has resigned, effective February 1, 1904.

The German Iron and Steel Industry in 1903

During the year 1903 the German iron and steel industry was chiefly affected by the renewal and extension of the syndicates. As was reported in October last a number of these syndicates were renewed on a broader basis, but the great German steel syndicate is still the subject of negotiations, and it is quite impossible to state whether it will be finally brought about or not. This syndicate is to embrace the entire steel production—the greater part of the products like billets, beams, track material, plates, wire, etc. These are to be handled by central selling bureaus, and it was the plan to take up at once further products, and more particularly bars.

The employment of the German iron industry was very ample during the whole of the year in consequence of the very heavy export and the large increase in the home consumption. The production of pig iron was greater than ever before, having attained during the first 11 months of 1903 9,236,886 tons as compared with 7,648,665 tons in the first 11 months of 1902. For the first time the annual production attains a total of 10,000,000 tons as compared with 8,400,000 in 1902, and 5,000,000 in 1893.

The iron production for the first 11 months of 1903 was distributed as follows in the different districts:

Pig Iron Production in Germany for 11 Months, 1903.

	Metric tons.
Rhenish Provinces and Westphalia	3,679,222
Siegen, Lahn district and Hesse-Nassau	662,491
Silesia	689,281
Pomerania	123,028
Hanover and Brunswick	327,689
Bavaria, Wurtemburg and Thuringia	145,483
Saar district	669,414
Lorraine and Luxemburg	2,940,278
Total	9,236,886

As will be seen from the following table the increase, as compared with the previous year, was greatest in the first seven months. The production was as follows, from month to month:

Monthly Production of Pig Iron.

	1902. Tons.	1903. Tons.	Increase in 1903. Tons.
January	656,688	792,053	135,365
February	597,334	744,835	147,501
March	681,340	854,144	172,795
April	672,912	833,588	160,676
May	710,420	870,371	159,951
June	695,073	839,541	144,468
July	705,921	865,343	159,422
August	736,836	875,829	138,993
September	718,702	848,889	130,187
October	742,502	869,463	126,961
November	730,928	842,830	111,902

The imports and exports were as follows for the first 11 months of the year:

Although the exports increased, as compared with the previous year, to the extent of about 7½ per cent., this does not bear any close relation to the production of pig iron, which expanded to the extent of 20 per cent. It proves, however, in a most striking manner, how greatly the home consumption has developed during the past year.

Prices for the home market on a number of the leading products were as follows at the beginning of each quarter for the years 1902 and 1903:

Fluctuations in Home Prices.

(In marks per ton.)

		Jan. 1.	April 1.	Oct. 1.	Dec. 1.
Spathic	1902	11.50	11.50	10.40	10.40
	1903	10.20	10.20	10.70	10.70
Roasted spathic ore	1902	16	16	14.40	14.40
	1903	14	14	15	15
Spiegeleisen	1902	74	72	69	67
	1903	67	67	67	67
No. 1 Foundry	1902	64	66.50	65	65
	1903	65	66	67.50	67.50
Iron bars	1902	100	117.50	115	105
	1903	105	108.75	111	110
Boiler plate	1902	105	160	160	150
	1903	127.50	150	150	150
Wire rods	1902	125	137.50	127.50	122.50
	1903	120	120	122.50	120

So far as the financial results of a number of the leading iron and steel concerns in Germany is converned, we take from the *Koelnische Zeitung* the following data:

Financial Results of German Stock Companies.

Name of company.	Capital in million marks.	Written off. Per cent. 1901.	1902.	1903.	Dividends. Per cent. 1901.	1902.	1903.
Bochumer Verein	24	8.23	6.42	6.58	13½	7	7
Dortmunder Union	70.6	1.62	0	3.84	0	0	5
Königs & Laurahütte	38.4	10.14	7.81	9	14	10	11
Aplerbecker Hütte	2.7	9.34	9.42	9.31	10	6	6
Baroper Walzwerk	1	4.18	4.7	6.29	0	0	0
Hochdahl	1.2	11.73	6.26	3.71	25	10	8
Donnersmarckhütte	17.1	8.6	12.32	11.40	16	14	14
Düsseldorfer Eisen & Draht Industrie	4	2.69	3.41	3.90	0	0	0
Friedrich Wilhelms Hütte	5.4	4.7	7.58	5.41	4	5	4
Gutehoffnungshütte	35.3	12.72	10.91	9.63	20	20	20
Hagener Gussstahlwerke	1.8	4.1	4.31	20.58	0	0	0
Hasper Eisen & Stahlwerke	3.8	8.83	8.64	8.93	0	2	7
Hörder Verein	39.7	5.43	5.12	6.55	5	0	4
Eisenwerk Hoesch	25.5	8.4	9.27	9.15	10	0	8
Oberschlesische Eisenindustrie	28.6	6.38	4.43	4.73	10	2	0
Phœnix, Laar	31.1	7.5	7.5	8.18	4	0	8
Rheinische Stahlwerke	36.2	5	4.97	4.97	10	5	8
Schalker Gruben & Hütten	20.1	8.32	10.04	12.88	32.5	30	32.5
Schulz Knaudt	3.2	6.48	6.65	4.6	12	8	4
Westfäl Drahtindustrie	5.5	3.77	4.50	4.70	10	9	8
Westfäl Stahlwerke	9.1	6.89	4.15	4.10	0	0	0
Wissener Bergwerke & Hütten	4.2	15.48	11.8	7.14	15	12.5	10
Gusstahlwerk Witten	3.5	10.91	7.46	7.29	12	7	4

It will be observed that in nearly every case the dividends for the year 1903 are better than they were for the preceding year.

German Imports and Exports (11 Months).

	Imports. January 1 to November 30. 1903. Tons.	1902. Tons.	1901. Tons.	Exports. January 1 to November 30. 1903. Tons.	1902. Tons.	1901. Tons.
Old material	54,095	30,062	24,909	102,916	159,613	126,249
Pig iron	142,007	137,465	256,268	395,028	310,415	131,050
Angles	329	170	504	387,152	352,799	318,418
Railroad angles and ties	63	19	17	59,393	40,953	31,018
Railroad tie plates	19	7	115	6,325	4,715	5,894
Rails	116	129	473	354,696	319,005	161,575
Bars	24,113	22,818	20,480	319,808	329,166	296,616
Ingots, blooms, billets, &c.	2,043	1,331	1,453	589,099	558,885	158,370
Plates	1,120	1,545	2,025	256,976	249,083	231,760
Tin plate	15,789	15,051	9,179	163	139	144
Wire	5,360	5,545	5,906	152,761	137,857	141,443
Wire, galvanized, &c.	1,229	1,038	1,126	79,223	78,381	84,814
Coarse iron castings	8,494	8,786	15,965	59,577	29,446	25,465
Bridges and parts thereof	126	54	468	6,154	8,996	468
Wire rope	210	136	171	3,475	2,882	3,628
Forgings	123	76	83	4,168	2,221	2,336
Axles, tires, &c.	298	579	840	44,639	44,447	45,747
Ordnance	12	5	5	177	567	249
Tubes	8,948	9,917	11,525	60,472	50,506	43,876
Coarse iron goods	7,989	7,234	10,794	121,304	111,439	98,560
Bicycles	201	218	238	3,126	2,213	1,682
Typewriters	123	103	85	74	52	35
Totals, exclusive of machinery	286,150	254,680	380,109	3,216,266	2,989,633	2,093,926
Increase (+) or decrease (−) over 1903	....	+31,470	−93,959	.....	+226,633	+1,122,340

Trade Publications.

Lathes.—The Bradford Machine Tool Company, Cincinnati, Ohio, have issued in their catalogue No. 23 a most magnificent specimen of the printer's art. The pamphlet is of medium standard size and consists of 68 pages, wherein halftone engravings of the very highest quality show with unusual clearness the general appearance and detailed construction of the various types of engine and turret lathes produced by the company.

Boring, Drilling and Milling Machine.—In a ten-page folder of medium standard size the Fosdick Machine Tool Company, Cincinnati, Ohio, present some very fine illustrations, showing the general appearance and construction of their new horizontal boring, drilling and milling machine, accompanied by dimensions and specifications in brief for the two sizes which are being made.

Industrial Railways.—An 8 x 10½ inch 94-page catalogue from the Hoshor-Platt Company, 120 Liberty street, New York, shows fully the line of industrial railway equipment, as well as special hoisting and conveying apparatus, made and supplied by this company.

Fans and Blowers.—Catalogues Nos. 118, 145 and 155 of the American Blower Company, Detroit, Mich. The first and second are second editions of the company's mechanical draft catalogue and its treatise on the heating and ventilating of manufacturing establishments. No. 155 is a new catalogue of steel plate fans. The company's large line of these fans is shown, and the usual tables of reference for use in connection with their installation are appended. Size of these pamphlets corresponds to the company's standard, 7¼ x 8¾ inches.

Electrical Machinery and Appliances.—The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Circulars Nos. 1058, 1059 and 1066, conforming to the company's standard size, 7 x 10 inches. No. 1058 consists of 12 pages and refers to the No. 76 electric railway motor. Circular 1059 devotes 24 pages to treatment of electric motor vehicle equipments. No. 1066 illustrates and describes type H constant speed induction motors.

Logging Engines.—Catalogue L-1, 9¾ x 7½ inches, 48 pages, illustrating and describing the line of logging and general hoisting engines and equipment as built by the Willamette Iron & Steel Works, Portland, Ore.

Slate Drill Press.—Bulletin No. 3047 of the Emerson Electric Mfg. Company, St. Louis, Mo., 7 x 10 inches. This is a leaflet briefly setting forth the merits of the single spindle, directly motor driven slate drill press, recently added to the line of manufacture of this company. Also bulletin 3000-A of six pages, same size, giving the company's terms of sale and their telegraphic code, for the use of purchasers and correspondents.

Telephones.—Bulletin No. 10 of the Stromberg-Carlson Telephone Mfg. Company, Rochester, N. Y., and Chicago, Ill., is a pamphlet of 12 pages, 9 x 6½ inches. The subject treated is the mine telephone developed and recently introduced by these people.

Triplex Pumps.—"Pump Data" No. 5, sent out by the Allentown (Pa.) Rolling Mills, illustrates and briefly describes the Aldrich variable speed triplex pump, motor driven.

Switchboards.—The D'Olier Engineering Company's Bulletin No. A-3 has particular reference to the switchboards designed and installed by them. The pamphlet is of eight pages, 7 x 10 inches.

Automatic Steam Engines.—A 9¾ x 7¾ inch 40-page pamphlet, catalogue No. 3, issued by C. H. Brown Company, Fitchburg, Mass., elaborately illustrating and fully describing the Brown automatic cut off steam engine.

Egg Carriers.—The National Egg Carrier Company, Scranton, Pa., have issued a 16-page pamphlet catalogue of medium standard size, setting forth the merits of the company's devices for safely carrying and shipping eggs.

Electrical Machinery and Appliances.—Bulletins Nos. 4345 to 4351, inclusive, of the General Electric Company, Schenectady, N. Y. These conform in size to the company's bulletin standard, 8 x 10½ inches. The subjects of the several pamphlets named are as follows: No. 4345, induction motors; 4346, type CR feed regulators; 4347, GE-74 motors for electric traction service; 4348, type C carbon break automatic circuit breakers; 4349, belt driven form L continuous current generators for lighting and power; 4350, generators for electroplating, electrotyping and other electrolytic work; 4351, type TA regulators for alternating current generators. In a neat pamphlet of 24 pages, 8 x 10½, is described the General Electric Railroad, constructed by the General Electric Company in 1896 and constantly used since that time for development and test of various electric traction equipment and devices. Publication No. 8230 by this company is a pamphlet of 32 pages, 5¼ x 7¾ inches, relating to the care and maintenance of multiple inclosed arc lighting systems. Publication No. 9126 is of a similar size and consists of 76 pages, treating at great length the Thompson universal recording wattmeters. No. 9127 relates in 18 pages, also of the same size, 15 years' experience by the company in transformer manufacture. The company's supply catalogue, No. 7584, consists of 36 pages, 5¼ x 7¾ inches, in which are illustrated and described various electrical supplies especially designed or peculiarly adapted to marine service. Flyers Nos. 2118 to 2124, inclusive, are leaflets of two to four pages, 5¼ x 7¾ inches, treating severally of various devices, such as porcelain cleats, wall pockets, porcelain receptacles, fuse plugs, &c.

Insulators.—Catalogue No. 18 of C. S. Knowles, Boston and New York, is a very attractive compilation of 29 plates, 8¼ x 10 inches, illustrating the various types of insulators for high and low tension currents. Accompanying each illustration is a general specification regarding the particular pattern of insulator therewith shown. A few plates are devoted to various styles of insulator pins. From the same company comes a medium standard size catalogue of 50 pages, showing in usual catalogue form the complete line of standard insulators handled by the Knowles firm. High voltage transmission line fittings, including approved methods for corners, pole tops, wall entrances, &c., are very briefly treated in an eight-page booklet of small standard size.

Machine Tools.—A 32-page pamphlet catalogue of medium standard size, from George D. Walcott & Son, Jackson, Mich. In a series of handsome engravings are shown the various patterns included in a complete line of shapers made by this company. The contents also include a large rack cutting machine and a line of engine lathes.

Air Compressors.—The Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio, have issued a 6 x 7¾ inch catalogue of 120 pages, devoted to a complete and thoroughly illustrated exposition of the extensive line of air compressors and appurtenances as made by this branch of the International Steam Pump Company. Appended to the catalogue matter proper are several pages of valuable data relative to air compression and the use of compressed air. The catalogue closes with a telegraphic code. Bulletin No. L-509 issued by the company is of medium standard size and consists of nine pages devoted particularly to the Meyer-Gear air compressors, with rolling mill frames. Cincinnati air and gas compressors receive brief treatment in pamphlet L-26-A, which is of small standard size and consists of 16 pages.

Rotary Planers.—Catalogue No. 37 of the Newton Machine Tool Works is an approximately medium standard size pamphlet of 16 pages, whose contents illustrate and describe various types of rotary cutter planing machines, which constitute an important feature of the product of this company.

"Twist Drills, Their Uses and Abuses," is the title of a 4½ x 6½ inch 22-page pamphlet distributed by the Cleveland (Ohio) Twist Drill Company. The proper methods of grinding and using twist drills are described and illustrated by numerous very clear engravings. The treatment of the subject has been entered into quite exhaustively, yet without the use of technical words and phrases. The little treatise should, therefore, be of value to all users of twist drills.

Special Machinery.—The M. H. Treadwell Company, 95-97 Liberty street, New York, have issued a very attractive 48-page pamphlet, 6 x 8 inches, illustrations and descriptive text filling the various pages and giving a very good idea as to the comprehensive line of special machinery whose construction has been undertaken by this company. Near the center of the book is a little engraving showing "The First Blow," and representing practically the start of the present large concern. Operating the blower used in taking off the first heat in the company's improvised foundry are to be seen the faces of several men who are now officers of the company. On the succeeding page are shown views of the present works. The machinery illustrated in the catalogue includes the Edison dryer stack, lead coloring furnaces, miscellaneous cement and sugar machinery, &c., as well as various types of cars for transportation of cinder, hot metal, &c., in connection with the mines and steel works.

Wire Working Machinery.—A 70-page catalogue of medium standard size from the F. B. Shuster Company, New Haven, Conn., illustrating and describing in considerable detail the various types of wire straightening, cutting off and riveting machinery made by this firm.

Rotary Dryers.—The Ruggles-Coles Engineering Company, 39-41 Cortlandt street, New York City, in a 28-page catalogue of medium standard size show up in a very attractive manner their line of rotary dryers designed for various classes of service.

Pneumatic Tools.—The recently organized pneumatic tool department of the Ingersoll-Sergeant Drill Company, 26 Cortlandt street, New York, has issued a 32-page pamphlet of medium standard size illustrating with full details of construction the line of air hammers, drills, hose couplings, &c., which have thus far been developed and placed upon the market by this department of the company.

Pipe Machinery.—Sixty-two pages of medium standard size, bound in flexible boards, form a neat catalogue of the Bignall & Keeler Mfg. Company (Edwardsville, Ill.), by way of illustrating and describing the extensive line of pipe threading and cutting machinery made by them.

Screening Machines.—A 56-page catalogue of medium standard size and illustrating the Jeffrey Mfg. Company's (Columbus, Ohio) line of inclined shaking and rotary screens. The engravings are very clear and the descriptive matter correspondingly brief. A long list of users and an imposing array of testimonial letters are also given.

Vacuum Heating and the fuel economy claimed for this system are discussed at length in a pamphlet of 32 6 x 8 inch pages issued by Morgan & Co., Chicago, Ill. The contents are in narrative form, taking up the elementary principles of the subject from the simplest phases of the vacuum and its properties, and leading up to the arrangement and advantages of one-pipe and two-pipe vacuum heating systems.

Plate Metal Construction.—The Coatesville (Pa.) Boiler Works have issued a pamphlet catalogue of 24 pages, 5 x 8 inches, illustrating by typical examples the line of plate metal work done by the company. This includes stand pipes, chimneys, steam boilers, digestors for garbage disposal, tanks, &c.

Boring Machines.—Catalogue and treatise No. 3 by the Binsse Machine Company, Newark, N. J., consists of 40 pages, 5 x 7¼ inches. The contents are illustrative and descriptive of the horizontal boring machines made by the Binsse company, including various special details of construction. Accompanying the general catalogue is a little pamphlet of 12 pages, 4¾ x 6½ inches, reproducing several letters from users of the Binsse machines.

Bolt Cutters.—A catalogue of 12 pages, 8¼ x 5 inches, illustrating principally the standard line of bolt cutters made by the Norwalk (Ohio) Mfg. Company.

Cast Steel Tools.—An 8-page pamphlet of small standard size illustrating and listing wrenches, hammers and coal picks made from Tropenas steel by the American Brake Shoe & Foundry Company, Mahwah, N. J.

Continental Boilers.—Joseph T. Ryerson & Son, Chicago, Ill., have issued the sixth edition of No. 4 of "Ryerson New Library," treating especially the subject of Continental boilers with Morison corrugated furnaces. The pamphlet consists of 104 pages and is of the company's own standard size, 4⅝ x 7½ inches. Included in its contents are certain useful data and information in regard to boiler design and construction.

Tool Holders.—A 68-page pamphlet catalogue, No. 10, of small standard size, illustrating and listing the Armstrong line of tool holders for turning, planing, boring, slitting, threading, cutting off and drilling metals. In addition to the tool holders are shown various other machine shop specialties manufactured by the same company, the Armstrong Bros. Tool Company, 617-621 Austin avenue, Chicago, Ill.

Drop Forged Cranks.—Wyman & Gordon of Worcester, Mass., and Cleveland, Ohio, in a 40-page pamphlet of small standard size present illustrations and a list of the various standard forms and sizes of drop forged cranks made by them.

Metal Working Presses.—The E. W. Bliss Company, Brooklyn, N. Y., have recently sent out revised editions of several of their sectional catalogue publications, all of which are of the company's own standard size, 5 x 7¼ inches. A four-page leaflet illustrates and describes bolt head trimming presses; No. 1-B has for its subject inclinable power presses; No. 2-A, power punching presses and sprue cutters; No. 3-A, straight sided power presses; No. 6-A, foot and screw presses; No. 7-A, squaring, circle and slitting shears.

Automobile Vehicles.—A 5 x 7¾ inch pamphlet of 12 pages, exclusively descriptive of the Franklin motor cars for 1904, as made by the H. H. Franklin Mfg. Company of Syracuse, N. Y. The Franklin gasoline motors are of the four-cylinder type, air cooling.

NOTES.

The National Foundry, Mfg. & Supply Company of Williamsport, Pa., have compiled within the ten pages of a small standard size folder a condensed price-list of their power transmission appliances.

The D. M. Steward Mfg. Company, Chattanooga, Tenn., have distributed an eight-page pamphlet of small standard size describing genuine and Compo soapstone pencils and crayons for the use of metal workers.

The Globe Iron Works, Minneapolis, Minn., on a 7 x 11 inch mailing card, give an illustration of the White gasoline engine, and utilize the back of the card for reproduction of five testimonial letters from users of the machine.

The Link-Belt Engineering Company, Nicetown, Philadelphia, Pa., describe their case hardened sprocket wheels in a four-page leaflet of approximately medium standard size.

The Washington Coal & Coke Company, Pittsburgh, Pa., have issued to their friends a most attractive commercial reminder for the year 1904. The book is 7 x 9 inches in size, bound in seal leather and printed upon tinted paper, with edges burnished in gold. The front cover bears a portrait of the father of our country stamped in gold leaf above the name of the company, with whose compliments the book is sent. The book opens with several pages of information of value for almost daily reference in commercial matters. The main body of the book consists of pages, each of which is ruled to accommodate reminder entries for two days. Sundays are, of course, omitted as superfluous in a book of this character. These pages are followed by monthly pages for cash account, and for bills payable and receivable. Closing the book are several pages for addresses. The Washington Company are extremely modest in the amount of their own advertising matter accompanying the book, this being limited to a brief statement of their business on the inside of the front cover and to four half-tone illustrations of their works, illuminating the front and back fly leaves.

The American Tool Works Company, Cincinnati, Ohio, in a 20-page pamphlet of small standard size, give illustrations and brief descriptions of the various tools of their regular manufacture.

The Thomas & Lowe Machinery Company, Providence, R. I., have got out a leaflet of small standard size, illustrating their Union planer chucks, with round and square bases.

The Yale & Towne Mfg. Company, 9-13 Murray street, New York, in an eight-page folder of small standard size, illustrate "Three Labor Savers" in the form of triplex, duplex and differential chain hoists.

Rossiter-MacGovern & Co., 17 Battery place, New York, have issued a 3½ x 8 inch pamphlet of 36 pages, constituting a condensed list of the electrical steam machinery in which the company are dealers.

The Bullard Machine Tool Company, Bridgeport, Conn., recently distributed an advertising novelty constructed somewhat upon the jack-in-the-box principle, such that upon raising the lid there rises into view an illustration of the new Bullard 42-inch boring and turning mill, accompanied by a brief exposition of its special merits.

The Rollins Engine Company, Nashua, N. H., by means of a 5½ x 7 inch mailing card, call attention to the fuel saving qualities of the Rollins engine.

The Lansing (Mich.) Motor & Pump Company, in a 5½ x 8½ inch, four-page leaflet, illustrate and briefly describe their gasoline engine and their feed grinder. The feed grinder is more fully treated in a four-page leaflet of approximately small standard size.

The Patterson Tool & Supply Company, Dayton, Ohio, have distributed a number of medium standard size sheets, each descriptive of one machine of the various lines manufactured by them.

The Thomas H. Dallett Company, York and Sedgley avenues, Philadelphia, Pa., call attention to the merits and convenience of their plug drills by means of a 6 x 9 inch mailing card.

The Miami Valley Machine Tool Company, Dayton, Ohio, have issued several leaflets or folders of medium standard size illustrating and briefly describing their 13½-inch engine lathe, the Tiffany universal boring tool holder, the Gem lathe center grinder and the Dayton power hammer.

The Packard Motor Car Company, Detroit, Mich., have issued a pamphlet of eight medium size pages, relating to their four-cylinder model L automobile vehicle.

The Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, describe in a four-page leaflet of approximately medium standard size their recently designed Globe tool sharpener.

Eaton & Prince Company, manufacturers of passenger and freight elevators, Chicago, have issued an exceptionally handsome catalogue, printed on heavy enameled paper and illustrated with half-tone views of their elevators and the machinery connected therewith. They devote much space in the book to their direct connected electric elevator engine.

The *Bulletin* for January, issued by the S. Obermayer Company, Cincinnati, Chicago and Pittsburgh, contains a number of interesting and practical articles of value to the foundryman. This periodical shows excellent judgment on the part of the editor, E. J. Woodison, the company's agent at Detroit. Familiarity with foundry practice and the faculty of observing peculiar conditions in the trade are evinced in every issue.

The New Year's number of the *Arrow*, published by the N. & G. Taylor Company, Philadelphia, Pa., has for its frontispiece an illustration of their original place of business, at Second and Race streets, Philadelphia, the engraving being reproduced from an old print in their possession. This house was established in 1810. The contents of this issue are varied and interesting, comprising clever "Taylor-Made Tin Types," a talk by Rufus the Roofer on "Taylor Old Style Roofing Tin," and suggestive sets of New Year's resolutions for the architect, the builder and the tin roofer.

The industrial development along the upper Niagara River, especially at Niagara Falls, is acting as an inspiration to the manufacturing interests to secure better river channels between Lake Erie and the Falls. A River Improvement Committee has been appointed, consisting of the following: Theodore S. Fasset, Harvey L. Brown, W. A. Rogers, Maurice B. Patch, George A. Ricker, W. Caryl Ely, J. W. Robinson, George P. Sawyer, W. B. Rankine, W. H. Gratwick, F. A. Dudley and John G. Milburn. These gentlemen represent the industrial interests of Buffalo, the Tonawandas and Niagara Falls, and together they form a committee that should have vast influence for the improvement of the large industrial interests of Western New York.

The Westmoreland Savings & Trust Company of Greensburg, receivers for the Reese-Hammond Fire Brick Company of Bolivar, Pa., have filed an inventory of the company's assets. The statement shows total assets of real estate and personal property amounting to $915,609.59. The total liabilities are not stated, but they are said to be far less than the assets, insuring the payment of all claims. The inventories were: Reese-Hammond Fire Brick Company, $573,978.36; Curwensville Fire Brick Company, Curwensville, Clearfield County, Pa., owned by the Reese-Hammond Company, $234,841.51; United States Enameled Brick Company's plant, Bolivar, $67,534.92; Hammond, Berkey & Co., Bolivar, general mercantile establishment, $39,247.80.

MANUFACTURING.

Iron and Steel.

Owing to high water, the furnace of the Sharon Steel Works of the Carnegie Steel Company, at Sharon, Pa., was banked. The mills were also shut down.

The Helmbacher Rolling Mills, St. Louis, Mo., after a shutdown of several weeks, have posted notice for a resumption of operations on January 25.

The Girard Mill of the Carnegie Steel Company, at Girard, Ohio, which has been idle for some time, has again resumed operations.

Neville Furnace of the American Steel & Wire Company, at Pittsburgh, which has been idle for several months, will resume blast early in February.

Clinton Furnace of the Clinton Iron & Steel Company, South Side, Pittsburgh, which has been shut down for several months, will resume blast at an early date. During the shutdown the furnace has been extensively repaired and considerable new equipment added.

The Independent Rolling Mill Company are making extensive improvements and additions to their recently acquired plant at Cuyahoga Falls, Ohio, and expect to have everything in shape to start early in February. When the 18-inch muck mill, recently purchased from the Kelly Nail & Iron Company, Ironton, Ohio, is installed the company will be in position to take on a full line of bar iron and steel specifications.

All but one of the 11 Edgar Thomson stacks of the Carnegie Steel Company at Bessemer are now in blast. Two of the three Isabella stacks of the Carnegie Steel Company at Etna are also in blast.

At the annual meeting of the stockholders of the New Castle Forge & Bolt Company, New Castle, Pa., the following directors were re-elected: Charles J. Kirk, George L. Patterson, T. F. Morehead, J. N. Martin, Frank Ryman, George Greer and A. B. Whielden.

The Ward-Dickey Steel Company, Indiana Harbor, Ind., expect to have their building completed, machinery installed and be in active operation prepared to fill orders by or before March 1. The company will supply all gauges of planished sheets from 14 to 28 gauge, inclusive, and in sizes to suit the demands of consumers.

The rod, wire and wire nail mills of the American Steel & Wire Company, at South Sharon, Pa., have been put on double turn to meet the very active demand for wire and wire nails.

At a recent meeting of the Newark Iron & Steel Company, Newark, Ohio, J. M. Swartz was elected president, J. W. Lee vice-president, and William E. Miller secretary and treasurer.

The telegraphic report that a loss of $3,000,000 had been sustained by the burning of the warehouse of the Shelby Steel Tube Company, Shelby, Ohio, on January 20, appeared to have been one of the greatest exaggerations on record. Officials at Shelby say that the loss will hardly be over $10,000.

The old rail mill department of the Edgar Thomson Steel Works of the Carnegie Steel Company, at Bessemer, which has been idle since last fall, has been started up. This was the original mill built by Capt. William R. Jones, and rolls light rails from 12 to 50 pounds in weight.

The open hearth department of the South Sharon Works of the Carnegie Steel Company, at South Sharon, Pa., has been put in operation on double turn. The only department of this plant that is now idle is the skelp mill.

The Lackawanna Steel Company are delivering large shipments of girder rails to the Youngstown & Southern Railway Company, at Youngstown, Ohio.

A petition will be presented to the courts at Pittsburgh on January 30 for the dissolution of the Pittsburgh Sheet Mfg. Company. The company were taken over several years ago by the American Sheet Steel Company.

The Vulcan Iron Works, Seattle, Wash, have procured the site and most of the machinery for their new rolling mill, and expect to begin the work of construction this spring.

Work has been resumed at the National Pipe Mills, in Chester, Pa., after a shutdown of one week.

The Bessemer department, No. 1 blooming mill and the rail mill of the Pennsylvania Steel Company, at Steelton, Pa., resumed operations on January 25, after a shutdown of some weeks.

General Machinery.

The shops of the Pittsburgh & Lake Erie Railroad at McKee's Rocks, Pittsburgh, have started up on full time. For several months the employees have been working only three days a week of eight hours each, but are now working six days of ten hours.

The Erie Railway Company are making important improvements at their repair shops at Galion, Ohio. They are at present installing a large steam hammer and a large engine lathe. They are expecting deliveries of other tools in the near future.

The Sensitive Governor Company, Indianapolis, Ind., have been consolidated with the Monarch Governor & Machine Company of the same city, and the governors will hereafter be manufactured at the latter plant. John R. Allen, principal stockholder of the Sensitive Governor Company, will retire from active interest in the business. His son, Oliver M. Allen, secretary of the Sensitive Company, will remain.

The Lewiston Machine Company, Lewiston, Maine, have made an assignment.

The firm of Gage & Rowe, proprietors of the Burford Foundry & Machine Works, Burford, Ga., have dissolved, J. T. Rowe retiring. The business will be continued by D. H. Gage.

It is stated that the plant of the Stilwell-Bierce & Smith-Vaile Company, Dayton, Ohio, is working to full capacity, and it is expected that the financial affairs of the company will be straightened out within a few weeks.

The Pittsburgh works of the American Locomotive Company have ready for shipment four locomotives for the Tehuantepec National Railway. These engines will burn oil and weigh about 60 tons, having cylinders 18 x 24 inches. They are equipped with modern appliances, including monitor injectors, Nathan lubricator, high speed brakes, electric headlight and cab lighted by three electric bulbs. The Pittsburgh works have also just completed the building of 25 new engines for the Southern Railway, six of which have been delivered to the St. Louis division at St. Louis, and 19 of which are being erected at Knoxville, Tenn. These engines are for freight service, are of the consolidated type, weigh 100 tons and have cylinders 22 x 32 inches. While it is probable that the Pittsburgh works will not be so rushed with orders for delivery this year as in 1903, there will be enough work to keep the shops running full time throughout the season.

The newly organized Landis Machine Company, Waynesboro, Pa., began operations last week, manufacturing the A. B. Landis patent bolt cutter.

The Harrigan Sectional Bearing Company have been incorporated at Buffalo, N. Y., capitalized at $100,000, to manufacture patented bearings. The directors are Francis T. Donald, Nelson S. Hallett and Edwin B. Collister.

The A. T. Hagen Company, Rochester, N. Y., manufacturers of laundry machinery, have purchased the plant of the Graham Machine Company, who had heretofore made the machinery for the Hagen Company. They have also purchased the Long foundry on West street. Both of these plants are to be operated by the new owners, and there will be no change in the practical management. John Long will continue in charge of the foundry and John Kane in charge of the machine shop, which positions they have held for a number of years. The A. T. Hagen Company are arranging to increase their capital stock, so that the heads of the departments may obtain an interest in the company.

There is no truth in the report that the Pennsylvania Railroad is negotiating for the plant of the Rockaway Iron & Steel Company, Rockaway, N. J.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, have recently received the following orders for elevating and conveying machinery: Iroquois Portland Cement Company, Caledonia, N. Y.; Elk Rapids Portland Cement Company, Elk Rapids, Mich.; Grasselli Chemical Company, Cleveland, Ohio; Struthers Furnace Company, Struthers, Ohio; Sandusky Portland Cement Company, Sandusky, Ohio; Sherwin-Williams Company, Cleveland, Ohio; Cleveland Gas Light & Coke Company, Cleveland, Ohio; Farmers' Chemical Company, Cleveland, Ohio, and the South Lorain Coal Company, Lorain, Ohio, and also from the Rossland Power Company, Rossland, B. C., for mining machinery.

James Levy of M. Levy & Co., wholesale hardware dealers, 149-151 Water street, Norfolk, Va., is in the market for a machine for concaving razors, water ground preferred, machine for grinding barbers' clippers and shear grinders.

The Pittsburgh Shear Knife & Machine Company, Pittsburgh, Pa., have changed their name to the Heppenstall Forge & Knife Company. The management continues the same as heretofore.

The recently organized Columbus Foundry & Machine Company, Columbus, Ohio, have installed a new plant for the manufacture of the Winget concrete machine, concrete mixers, &c., which they expect to enlarge in the spring. The Winget machine is for the manufacture of concrete blocks for building purposes. J. F. Angell is president.

The Warner & Swasey Company, Cleveland, Ohio, have completed the new addition to their works.

The United States Engineering & Construction Company, 1030 Williamson Building, Cleveland, Ohio, have taken the contract for building the Wabash & Rochester Railway, an electric line which will connect the Indiana towns mentioned in the title. The road will be single track, 40 miles long, built on private right of way. The power station will be located at Roann, and in it will be installed 900 horse-power of boilers, two 680 horse-power cross compound condensing engines and direct connected generators. Adjoining the power house will be a car house and machine and repair shop. The rolling stock will include two electric locomotives, six passenger coaches, six open trail cars, ten box cars, ten dump bottom

construction cars and two snowplows. The United States Engineering & Construction Company will shortly place contracts for all this equipment, together with rails, track and line equipment. G. A. Bartholomew is chief engineer of the company.

Bardons & Oliver, Cleveland, Ohio, manufacturers of screw machinery and turret lathes, are running as many hours and with as large a force as at any time in the past two years. In common with other machine tool manufacturers they have experienced a falling off in the demand from this country, but their present activity is occasioned by a desire to lay in a stock of tools for immediate delivery. Their stock at present is smaller than they have had in many years, this condition being occasioned by the fire last year, which destroyed their plant and a large stock of tools. Up to the present time they have been very busy filling back orders, and now they are just getting into shape to lay in a stock of tools. Their foreign business, particularly from England, Russia and France, seems to be on the increase. They are enjoying a very large demand for bicycle hubs, and are shipping these goods to nearly every portion of the civilized globe. Their forging business is quiet, although there is some activity in the automobile forging line.

The Robinson Automatic Machine Company, Detroit, Mich., are an incorporation of a partnership business formerly done under the name of the Robinson Automatic Polishing Machine Company, the plant of the latter company being absorbed by the incorporated concern. Essentially the business of this company is the manufacture and sale of the Robinson automatic polishing machine, which is adapted to the polishing of all kinds of castings, gas stove pipe and other pipe, the buffing of brass tubing, polishing of sad irons, &c. A large number of these machines have been installed in stove plants, brass and iron bed factories and sad iron factories. The capital stock of the new company is $50,000. Those interested as stockholders are Wm. V. Robinson, Wm. A. Dwyer and John O. Campbell.

The North Star Mfg. Company, general machinists and sheet metal work, Minneapolis, Minn., have incorporated for $20,000, the incorporators being Jerry G. Hoffken, George Stewart, Granville F. Prescott and William Furst. The company are offering some of their stock for sale in order to buy more machinery, including a shaper, 24-inch lathe and 13-inch lathe.

The North West Machinery & Iron Company, Limited, Winnipeg, Canada, have incorporated, with a capital stock of $40,000, to deal in Blacksmiths' supplies, tools and general machinery. The officers of the company are Hon. R. P. Roblin, president; Hon. H. J. Macdonald, vice-president; A. Merrill, secretary; H. Vermilyea, treasurer, and C. Vermilyea, manager.

Power Plant Equipment.

Creditors of the Dayton Gas Engine Company, Dayton, Ohio, have filed a petition in court asking that the company be adjudged bankrupt.

The Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio, have begun the installation of a $30,000 gas pumping station for the Heat, Light & Power Gas Company, Muncie, Ind.

The Warren Electric Company, Sandusky, Ohio, are building a 10,000-light incandescent generator for a new lighting plant at Martinsburg, W. Va. This is one of the largest generators they have ever built, and it will weigh over 100,000 pounds.

J. T. Long has secured a contract to illuminate the town of Mechanicsburg, Ohio, and he will start work at once on the erection of a plant for supplying current for lighting, domestic and manufacturing purposes.

The Jacobson Machine Mfg. Company, Warren, Pa., have commenced to manufacture the Jacobson gas engine, with improvements recently added which after the most complete tests have proved eminently satisfactory.

The city of Reading, Pa., is to erect a $200,000 municipal electric light plant, capable of furnishing 1000 2000 candle-power arc lights and 3000 32 candle-power incandescent lights. F. W. Frankhauser is chairman of special commission.

H. Jeanneret, city clerk, Ligonier, Ind., will receive bids until March 9 for improvements to the water works system, including a 1,500,000 vertical pumping plant, 125 horse-power boiler and other supplies.

L. H. Field and Rayner Field of Jackson, Mich., have bought the interests of N. D. Carpenter and A. E. F. White in the Albion Engine & Motor Works, Albion, and with W. D. Brundage are now the owners of the company. The company, who make the Miller gasoline engine, have outgrown their present quarters and the business will be moved to a larger plant in Jackson, where the output will be much increased. It is the intention of the new owners to make some important improvements in the engine. The officers are L. H. Field, president; W. D. Brundage, vice-president and general manager, and Rayner Field, secretary and treasurer.

The Springfield Boiler & Mfg. Company, Springfield, Ill., have recently sold direct and through C. K. Sherman, their Chicago representative, the following internally fired boilers, with Morison corrugated furnaces: Erie Ice & Cold Storage Mfg. Company, Kenton, Ohio, two 125 horse-power boilers for the new 50-ton ice and cold storage plant which is being erected there and for which the York Mfg. Company, York, Pa., are supplying the ice and refrigerating machinery; City Water Works, Bowling Green, Ohio, two 75 horse-power boilers to replace tubulars; City Water & Light Works, Elroy, Wis., one 150 horse-power to replace patented boiler; Water Works, Hastings, Neb., one 250 horse-power boiler in addition to one of the same capacity supplied some time ago: Yaryan Company, Ada, Ohio, hot water heating plant, one 250 horse-power boiler; Peet Brothers Soap Company, Kansas City, Mo., one 300 horse-power at 185 pounds pressure, with Hawley down draft attachment.

The S. Freeman & Sons Mfg. Company, Racine, Wis., recently secured a contract for furnishing three 250 horse-power internally fired boilers, with Morison corrugated furnace, from the city of La Crosse, Wis.

J. G. O'Neil, contracting engineer, The Rookery, Chicago, has taken orders during the past few weeks for the following internally fired boilers with Morison corrugated furnaces: One 250 horse-power, water works, Pueblo, Col.; two 125 horse-power, water works, East Chicago, Ind.; one 125 horse-power, electric power plant, East Chicago, Ind.; one 200 horse-power, Austin Mfg. Company, Harvey, Ill.; one 150 horse-power, J. W. Barwell Company, Waukegan, Ill.; one 200 horse-power, Boston Store, Chicago; two 150 horse-power, John Davis Company, Chicago; one 150 horse-power, F. Newhall & Sons, Chicago; one 100 horse-power, Sanitary Laundry, Chicago; one 100 horse-power, Garden City Sand Company, St. Charles, Ill.

The New Era Iron Works Company, Dayton, Ohio, have changed the style of the firm name to the New Era Gas Engine Company.

The Tampa Electric Company, Tampa, Fla., will expend about $100,000 in the installation of a plant and the building of a new power house.

The Aultman-Taylor Company, Mansfield, Ohio, manufacturers of boilers, are preparing an interesting exhibit for the St. Louis Exposition. It will consist of 16 horizontal water tube boilers in eight batteries, representing 7218 actual horse-power, with a heating surface of 72,172.3 square feet. The exhibit will be installed in the Steam, Gas and Fuels Building and will be in actual operation. Two of the boilers are high pressure boilers to be operated under 225 pounds of steam, and they will supply steam for a large turbo-generator. The boilers are to be equipped with Mansfield chain grate stokers, which are manufactured by the company, also with induced draft apparatus furnished by the Buffalo Forge Company of Buffalo. The latest ideas in link belt coal conveying and ash removing devices will be used in connection with the installation.

The Rockford Edison Company, Rockford, Ill., have a contract for furnishing power for the Rockford & Freeport Railway and are installing at the present time a 650-kw. 500-volt direct current generator, direct connected, with a cross compound condensing McIntosh & Seymour engine of like capacity. This generator furnishes current to a 500-kw. inverted rotary, which is conected to step-up transformers, furnishing high tension a. c. to the line.

Foundries.

The Alliance plant of the American Steel Foundries, at Alliance, Ohio, has been closed down in all departments for an indefinite period.

The Pittsburgh Stove & Range Company, Pittsburgh, have sold the old Walters-Walker Stove Company foundry, at Sharpsburg. The property was taken over by the Pittsburgh Stove & Range Company several years ago, but has never been operated.

The Canton Malleable Iron Company, Canton, Ohio, have been reorganized and a new Board of Directors elected, as follows: Joseph Dick, William H. Hoover, New Berlin; W. L. Stolzenbach, Burt A. Miller, Gordon Mather, L. A. Loichot and Thomas F. Turner. The directors organized by electing Joseph Dick president and manager and Burt A. Miller, secretary and treasurer.

The Denver Steel Casting Company, Denver, Col., expect to start work on the construction of their plant within the next 30 days.

The Jeffrey Mfg. Company, Columbus, Ohio, through their connection with the Ohio Malleable Iron Company of the same place, are now in the field soliciting orders for high-grade malleable castings.

A new foundry company are being organized to erect a foundry at Wellsburg, W. Va. The capitalization is to be $10,000, $7000 of which is to be expended for the plant. Henry A. Stengle is at the head of the project.

The National Foundry, Mfg. & Supply Company have been organized at Williamsport, Pa., for the manufacturing and selling of machinery, or any article of commerce made from iron or steel, or both, or any other metal, and will ask for a charter at Harrisburg, Pa., on February 4. H. R. Willi and G. D. Gingrich are leading stockholders.

The plant of the Vulcan Foundry & Machine Company, at New Castle, Pa., manufacturers of sheet mill and tin plate equipment and of ingot molds, which has been closed down for sev-

eral weeks for extensive repairs, will start up again this week. The company have some good sized orders on their books and expect to run their plant to full capacity right along.

The Hub City Iron Works, Aberdeen, S. D., have incorporated for $25,000. The company will enlarge their plant by the erection of a foundry.

Bridges and Buildings.

The Wichita Bridge & Iron Company, Wichita, Kan., are not yet ready to figure on the additional machinery they will require for their proposed extensions. These will consist of a 50-foot addition to the machine shop, the erection of a new foundry, 142 feet in length, and a new boiler house. The boilers and engines necessary to furnish the increased power required have been secured.

The Des Moines Bridge & Iron Works, Des Moines, Iowa, report having expended $6000 for improvements during 1904 to their plant. Their capitalization was increased from $75,000 to $150,000 Business during the past year amounted to $300,000, which was 30 per cent. greater than for 1902.

The American Construction Company have been incorporated at Indianapolis, Ind., with $10,000 capital stock, to build beidges, culverts and do similar work. The directors are James E. Greer, Albert W. Moore and Joshua Zimmerman.

Fires.

The plant of the Lake City Engineering Company, Erie, Pa., was recently badly damaged by fire.

The cyanide mill of the United States Reduction Company, near Florence, Col., was burned January 21, causing a loss of about $100,000.

In a $300,000 fire at Sour Lake, Texas, January 24, the electric light plant was destroyed.

The plant of the American Fertilizer Company, Portsmouth, Va., was destroyed by fire January 20. The loss is placed at $100,000.

The Chicago branch of the Pittsburgh Plate Glass Company was completely destroyed by fire January 23, entailing a loss of about $250,000. It was only about a year ago that the same company suffered a similar loss and rebuilt the plant that has just been destroyed with a view of making it as nearly fire proof as possible.

On last Thursday the iron foundry of Alexander Miller & Brothers, formerly Brown & Miller, 10-14 Morris street, Jersey City, N. J., was destroyed by fire. The building was 75 x 100 feet, and it is understood that all the machinery was destroyed. The loss is placed at $50,000.

The factory of William F. Simes & Co., Philadelphia, Pa., manufacturers of camphor products, was destroyed by fire January 26. The loss is placed at $50,000.

Hardware.

The Dwiggins Wire Fence Company, Anderson, Ind., have increased their capital stock from $75,000 to $125,000.

The Arm, Bracket & Pin Company, Indianapolis, Ind., have increased their capital stock from $10,000 to $30,000.

The Wells Bros. Company, Greenfield, Mass., are pushing their bushing pipe adjustable die, which is meeting with excellent success in the trade. The company report general business as very good.

The business of F. E. Wells & Son of Greenfield, Mass., has been incorporated as the F. E. Wells & Son Company, with a Massachusetts charter. The officers are: President, F. E. Wells; treasurer, F. W. Wells, and superintendent, G. H. Williams, these parties also constituting the Board of Directors.

The Crandall Cutlery Company, Bradford, Pa., manufacturers of pocket cutlery, have commenced operations in their new building. They report that orders in hand will require running to their full capacity during the whole of the present year.

The Lewis Spring & Axle Company, Jackson, Mich., have recently installed new machinery, by which the output of their plant has been materially increased. They have also put in a number of cranes and air hoists for handling material.

Eclipse Mfg. Company, Bennett Building, Detroit, Mich., have been organized for the purpose of manufacturing a new ball bearing trolley base. This base is designed to give the maximum amount of horizontal flexibility, so as to enable the trolley wheel to follow easily any variations in the alignment of the trolley wire. The base is made of malleable iron, with three sets of groover to afford raceways for the 34 ½-inch hardened steel balls.

The G. Drouvé Company of Bridgeport, Conn., furnished the Lovell window apparatus for the new express building for the Long Island Railroad at Long Island City, N. Y., and are at work upon another contract for the same device for the Delaware, Lackawanna & Western shops at Scranton, Pa. They are receiving orders from all over the country for the Lovell window and shutter device, and their business in that line is steadily increasing.

The Washington Cutlery Company, Milwaukee, Wis., have increased their capital stock from $25,000 to $75,000, and, besides their jobbing trade, will do a larger manufacturing business in the Village Blacksmith line of hand made butcher knives and tools. The officers of this company are Gustave H. Lehrkind, president; Charles Reichenbaum, vice-president; Hugo Volckmann, secretary and treasurer.

The Hard Wire Fence Company, Cuyahoga Falls, Ohio, whose plant has been idle for several months, will resume operations February 1. E. W. Hamlen of Jefferson, Ohio, and R. T. Littlefield of Cuyahoga Falls will operate the factory and are now putting it into shape for resumption.

The Animal Trap Company, Abingdon, Ill., have elected officers for the ensuing year as follows: President, F. W. Schultz; treasurer, L. S. Watts; secretary, A. D. Schultz. J. E. Cox, formerly a stockholder and treasurer of the company, has disposed of his interest to the three above named gentlemen.

The Turnbull Wagon Company, Defiance, Ohio, will build a two-story brick warehouse, 80 x 350 feet, with a storage capacity of 2000 finished wagons.

The Hamey Wagon Mfg. Company, Kinderhook, Ill., have incorporated, with a capital stock of $25,000, to build farm wagons, truck wagons, shoveling boards, &c. A new factory, 60 x 300 feet, will be built, and the company will be in the market for such machinery as is necessary in a plant of 2000 wagons capacity. The incorporators are B. F. Hamey, who is president and manager; C. B. Gose and F. A. Longnecker.

The E. R. Wagner Mfg. Company, North Milwaukee, Wis., during the past year added a new steel warehouse to their plant, 40 x 100 feet, and also built a fire proof vault to hold their special dies. Special machinery and tools have also been installed to take care of the increasing demand for the company's line of goods, which consists principally of hardware for baby carriages, go-carts, doll cabs and children's express wagons, their specialty being sheet metal stampings for these products.

Beall Bros., Alton, Ill., doubled their shovel capacity during the past year, and at the present time are making about twice as many shovels as they did a year ago. Business has doubled in their mining tool factory, and they are far behind on orders. The company have recently changed their power, installing a new Corliss engine and rope transmission. A further enlargement of their factories is expected this spring. Their approximate output in all lines for the year was fully four times what it was in 1902.

Sturges & Burn Mfg. Company, Chicago, formerly Sturges & Burn, manufacturers of milk cans and creamery supplies and sheet metal specialties, during the past year installed electric motors throughout their plant; also a power conveyor which transmits the finished product of the factory to the warehouse a block away. Elevators have also been provided, as well as chutes for the economical loading of the goods. Two new drawing presses of an exceptionally heavy type have been added to the press room equipment. A department for the manufacture of pasteurizers and also a milk bottle cap department have been fitted up. Skylights have been provided for the tinning and retinning departments, doing away with the necessity of having electric light, and the press, tools and machine and stock rooms have all been fitted up with arc lights. A superintendent's office and drafting room combined have been added to the plant. Business for the past year showed a decided improvement over 1902.

The Northwestern Barb Wire Company, Sterling, Ill., report an excellent business for 1903, the output being about six times greater than that of the previous pear. During the year they increased their capital stock from $100,000 to $175,000. They are preparing for an even larger trade during 1904, having installed new machinery, and further equipment is expected to be added later in the year.

The Mitchell & Lewis Company, Limited, Racine, Wis., wagon manufacturers, have had plans drawn for two new buildings, one 105 x 235 feet, and the other 100 x 333 feet, both five stories high. It is estimated that the cost of the structures will be $250,000.

The Edmonds-Metzel Mfg. Company, Chicago, with office and factory at 778 to 784 West Lake street, announce that on or before February 1 they will remove to their new factory at 153 to 159 South Jefferson street, where their facilities for production will be trebled. The company manufacture hardware and electrical specialties, dies, tools and sheet metal stampings and do general electroplating and experimental work.

The William A. Rogers Company, Limited, are making extensive changes and improvements at Niagara Falls, N. Y., preparatory to the concentration of their large business at that point. This company will occupy the brick building on Main street recently vacated by the Carter-Crume Company, Limited, and G. Alexander & Son of Cleveland have been awarded the contract for raising the structure 4½ feet in order that it will be on a level with the present plant of the William A. Rogers, Limited, adjoining, and provide a basement underneath. An additional story will be built on the rear portion. When the changes have been made the company will have about 85,000 square feet of floor space. In addition to acquiring the old Carter-Crume building the company have secured control of more land, which will be utilized in time. The first merger of

the several plants is expected to take place on or about April 1, when the hollow ware plant now located at Oneida will be moved to Niagara Falls. This plant now gives employment to about 100 hands, but when all the interests are merged at Niagara the company will be employing a total of from 500 to 600 hands. Another improvement contemplated is the erection of a power house.

The Hallwood Cash Register Company, Columbus, Ohio, have been taken over by the International Mfg. Company of that city, who were incorporated last week by S. W. Courtright, G. C. Urlin, G. W. Sinks, Joseph Schonthal and George W. Bright, all of Columbus. The company have a capital stock of $4,000,000, of which $2,500,000 will be preferred and the balance common stock. G. W. Sinks was elected president, Howard C. Parks secretary-treasurer, and W. T. Wells general manager. The company will manufacture a new register door lock and a computing scale, as well as the Hallwood line of cash registers. A factory addition will be erected at once.

Miscellaneous.

Last Saturday the Winton Motor Carriage Company, Cleveland, Ohio, entertained a party of 50 representatives of daily papers and automobile trade journals from New York, Boston, Philadelphia, Chicago and Cleveland. The Eastern gentlemen came in a special car, and the entire party made an inspection of the Winton plant, which by reason of recent large additions is now undoubtedly the largest automobile manufacturing establishment in the country; it will have an output of 1500 large touring cars this year. After the inspection the party was taken in automobiles to the Hollenden Hotel, where a fine banquet was spread. This was participated in by Mayor Tom L. Johnson and other prominent automobilists. The event was the sixth anniversary of the Winton Company.

The Rawson Electric Company, Elyria, Ohio, manufacturers of telephones and telephone apparatus, have combined with the Deene Mfg. Company of Chicago, who produce a similar line, and the two interests will be combined at Elyria, Ohio, where they have completed a deal with an allotment company, agreeing to erect a large plant, the main building to be 106 x 180 feet, and to employ 100 men after the first year, 250 men after the second and 350 men after the third year. Work on the plant is to start at once.

The Burt Mfg. Company, Akron, Ohio, manufacturers of the Cross oil filter, held their annual meeting last week and elected the following officers: W. J. Warden, president; H. F. Maranville, vice-president; W. J. Blackburn, treasurer; J. Asa Palmer, secretary; C. F. Beery, general counsel. The directors are the same as the officers, the only change this year being the election of an additional director, J. Asa Palmer. An excellent year's business was reported.

The Gaeth Automobile Company, Wardon street, Cleveland, Ohio, have leased the buildings in that city formerly occupied by the Broc Carriage Mfg. Company, and will equip them for the manufacture of gasoline automobiles, utilizing their present equipment, together with some new machinery which will be purchased at once.

The McKay & Dix Verona Island Shipbuilding Company, recently incorporated, will operate the first-class shipbuilding yard at Verona, Maine, formerly operated by Charles B. Dix, where he built at one time two four-masted schooners of 1450 tons each and one five-masted of 1800 tons. The plant is located on a 3-acre site with water and road privileges, and comprises a blacksmith shop, galvanizing plant, carpenter shop and other buildings, all of which are thoroughly equipped.

Biersach & Niedermeyer, Milwaukee, Wis., report a fire at their galvanized iron works plant on New Year's morning, doing damage to the extent of $10,000 to $13,000. Rebuilding will commence as soon as losses have been adjusted with the insurance companies, and the company expect to be in operation again within 60 days. Temporary quarters have been secured at 317 Wells street.

The Elm City Brass & Rivet Company, Plainville, Conn., have let the contract for the addition to their factory, which will be a building 50 x 220 feet.

The Waterloo Motor Works of Waterloo, Iowa, manufacturers of Duryea automobiles and Davis gasoline engines, have moved into their new factory and will shortly have their full force of men at work.

The Hartford Bedstead Company have been incorporated under the laws of Connecticut with a capital stock of $25,000. The incorporators are Henry Roberts, Charles E. Perkins and Arthur Perkins of Hartford. The company will be closely affiliated with the Hartford Woven Wire Mattress Company, of which Lieutenant-Governor Roberts is the manager.

The Reyburn Mfg. Company, Philadelphia, Pa., manufacturers of shipping tags, baggage checks, &c., will build a new factory at a cost of about $68,000. It will be a five-story brick structure and will cover a plot 60 x 207 feet.

The American Spiral Pipe Works, manufacturers of Taylor's spiral riveted steel pipe, 26 Cortlandt street, New York, have recently installed the following lines: 44,000 feet for 250 pounds working pressure for the Newhouse Mines & Smelters, Frisco, Utah; 2500 feet for 325 pounds working pressure for the Kimberly-Montana Gold Mining Company, Gardiner, Mont.; 7000 feet for 150 pounds working pressure for the Telluride Power Company, Provo, Utah. Their additional equipment, improved machinery and up to date methods of manufacture place them in position to make very prompt deliveries on all orders.

The independent gas companies in Venango and Clarion counties, Pa., have been absorbed by a new corporation recently organized by Pittsburgh capitalists, called the Pennsylvania Fuel Supply Company, with a capital of $1,000,000. The officers are: C. Crawford, Pittsburgh, president; F. L. Andrews, New Bethlehem, vice-president; H. C. Reeser, Pittsburgh, secretary and treasurer. H. M. Crawford will be the general manager. Nineteen towns along the Allegheny Valley and the low grade division of the Pennsylvania Railroad will be supplied by the company

The annual meeting of the stockholders of the Falcon Bronze Company of Youngstown, Ohio, was held last week, at which the following directors were elected: Richard Garlick, John Tod, G. A. Doeright, J. G. Swain and W. W. Bonnell. The directors organized by electing Richard Garlick president, John Tod vice-president, J. G. Swain secretary, and G. A. Doeright treasurer and manager.

The Acme Harvester Company, Peoria, Ill., whose works have been closed for several months because of financial difficulties, resumed operations January 25 with a large force of men.

William J. Wolfe, Waynesboro, Pa., is endeavoring to organize a stock company for the manufacture of an invention which he calls the Giant tire shrinker. The shrinker, he claims, will make possible the placing of tires upon wheels without the necessity of heating the metal tires.

The International Heater Company, Utica, N. Y., have increased their capital stock from $551,900 to $1,008,200. The increase is for the purpose of retiring the indebtedness of the company, which amounts to the entire increase, and when this stock is issued the company will be entirely free from debt. The company do not contemplate any unusual improvements to their plant.

William H. Wilder of the Central Oil & Gas Stove Company, Gardner, Mass., has bought in for the creditors the plant of the Florence Machine Company, at Florence. It is probable that a new company will be organized to operate the plant and continue the manufacture of oil and gas stoves of the Cleveland patterns.

James A. Miller & Brothers, Chicago, report a marked increase in orders and inquiries for steel protection for elevator inclosures and steel wire glass windows for manufacturing plants.

The Hudson Belting Company of Worcester, Mass., have incorporated under the Massachusets laws with a capital stock of $200,000.

The Superior Chain Company, Marysville, Pa., are endeavoring to secure a site for their plant in Harrisburg, Pa., and may remove to that city.

The Globe Iron & Wire Works, Chicago, report very large inquiry for fire escapes and steel elevator inclosures on the part of local building interests.

The Textile Specialty Company, Buffalo, N. Y., are to erect a factory at Pike, N. Y., 70 x 110 feet, two stories, with bleachery and engine house, and install necessary weaving and bleaching machinery; also equipment for electric lighting.

The Electric Porcelain Company of East Liverpool, Ohio, manufacturers of electrical insulators, will erect a large two-story addition, equipped with four kilns. They will also add to their power equipment.

The Marietta Plaster & Fuel Company, Marietta, Ohio, will erect a new plant to replace the one destroyed by fire some weeks ago. They will install machinery for the manufacture of all kinds of plasters; also for the manufacture of wood fiber. A large three-story building will be erected.

The Holland Palace Car Company, Indianapolis, Ind., will build car shops, probably at Columbus or Richmond, Ind. They have received two sleeping cars for interurban lines from Eastern factories, which they will run between Indianapolis and Columbus, Ohio, and other cities in that State. H. F. Holland is president.

The Century Stove Mfg. Company, Johnstown, Pa., have declared a 6 per cent. eight months' dividend. The company during the past eight months have manufactured 25,000 gas stoves.

John Byrd, Philadelphia, Pa., is to build an L extension to his plant, 32 x 108 feet. No new machinery will be installed at present.

The Wise Furnace Company, Akron, Ohio, have been incorporated with $50,000 capital stock, by W. G. Wise, H. E. Andress, George W. Carmichael, Crannell Morgan and J. W. Myers of Akron. They will manufacture patent furnaces and other heating apparatus. The plant will probably be located in Akron, but they have not yet decided upon a location.

The McCoy Canning Company will erect a large fruit cannery at Urbana, Ohio. There will be five buildings, including a machinery building, 50 x 80 feet, and a power house, 50 x 50 feet. Boiler and engine equipment of considerable capacity will be installed.

The Iron and Metal Trades.

One of the leading Iron merchants, speaking more particularly of the railroad, puts the situation tersely: "Those who want to buy have not got the money, and those who have the money will not buy now." The volume of business, with the exception of some branches, is disappointing, although at times hope is buoyed up by a temporary freer movement. The tonnage is not there, and the industry must simply adjust itself to the prevailing conditions.

In Pig Iron, the weakest section is now the Central West, where Foundry Iron is offering at low figures, while there is practically no sale of Bessemer or Basic Pig. At the Lake Erie points No. 2 Foundry has sold as low as $12.50, which is relatively much lower than the figures at which Southern makers are holding. Some of the latter appear to be growing uneasy at the loss of business. The efforts to get together have met with very scant encouragement, and there is very little hope of co-operation in any form.

In the East, special circumstances have led to a moderate advance in Basic Pig, which may hold for some time and may even gain headway; but there is no pretense that the condition of the Steel trade or the general situation warrants it. The advance is purely local.

The market for Steel Billets continues very narrow, but complaints continue to crop up of important concessions from the nominal official price, and particularly low figures are quoted on Axle Billets. Makers of Axles claim that they must secure cheap Steel in view of the very low figures at which Axles have been selling lately—namely, on the basis of 1.20 and 1.25c. per lb., Pittsburgh.

The Rail trade is very dull, the only transaction of any consequence noted being the sale of a lot of 10,000 tons to a road in Michigan. There are reports of good export orders, but they are closely guarded.

Only a moderate business is going in Structural Material and in Plates. In the latter the Sheet mills are proving troublesome competitors for the Lighter Plates.

Good reports are still coming from the Wire and Tube interests, the former in particular. Productive capacity is being strained to meet the requirements. There is quite an active market, too, in Bars.

It has been impossible to obtain any official statement relative to the reports that the leading interest has made an arrangement with Welsh Tin Plate makers to supply them with their Raw Steel, the consideration being that there will be no effort to market Tin Plate. The story seems plausible, since the same Steel interests have been steadily supplying Billets and Wire Rods to the Canadian Wire manufacturers in consideration of keeping out of the market for finished goods.

The leading Tin Plate interest in this country has just announced a reduction in the price of 15 cents per box, to take effect at once.

The markets for Old Material seem to be again at a standstill, the railroads rejecting the dealers' bids on the one hand and the consumers buying very sparingly on the other.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Jan.27, 1904.	Jan.20, 1904.	Dec.30, 1903.	Jan.28, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$14.50*	$14.75	$15.00	$22.25
Foundry Pig No. 2, Southern, Cincinnati	**12.50**	12.50	12.00	21.25
Foundry Pig No. 2, Local, Chicago	*14.00*	14.00	14.50	22.50
Bessemer Pig, Pittsburgh	*13.85*	13.85	14.10	22.85
Gray Forge, Pittsburgh	*12.75*	12.75	13.00	20.50
Lake Superior Charcoal, Chicago	16.75	16.75	16.75	26.50
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	23.00	23.00	23.00	30.00
Steel Billets, Philadelphia	24.50	24.50	24.25	27.00
Steel Billets, Chicago	24.00	24.00	24.00	30.00
Wire Rods, Pittsburgh	30.00	30.00	30.00	35.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**10.50**	10.00	9.50	18.00
O. Steel Rails, Philadelphia	**12.50**	12.00	11.50	20.75
O. Iron Rails, Chicago	**15.00**	15.00	13.00	24.00
O. Iron Rails, Philadelphia	**15.50**	16.00	14.50	23.50
O. Car Wheels, Chicago	**13.50**	13.50	13.00	24.00
O. Car Wheels, Philadelphia	**13.00**	13.00	12.75	20.50
Heavy Steel Scrap, Pittsburgh	**13.00**	13.50	11.00	21.00
Heavy Steel Scrap, Chicago	**10.50**	10.00	9.50	18.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.35	1.35	1.35	1.93½
Common Iron Bars, Chicago	**1.40**	1.40	1.30	1.75
Common Iron Bars, Pittsburgh	*1.29¾*	1.29¾	1.34¾	1.80
Steel Bars, Tidewater	1.44½	1.44½	1.44½	1.75
Steel Bars, Pittsburgh	1.30	1.30	1.30	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	2.10
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.75
Beams, Tidewater	1.74½	1.74½	1.74½	1.75
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	*1.40*	1.50	1.50	1.90
Skelp, Sheared Iron, Pittsburgh	*1.45*	1.50	1.50	1.95
Sheets, No. 27, Pittsburgh	*2.15*	2.20	2.25	2.65
Barb Wire, f.o.b. Pittsburgh	**2.50**	2.50	2.45	2.50
Wire Nails, f.o.b. Pittsburgh	**1.90**	1.90	1.85	1.90
Cut Nails, f.o.b. Pittsburgh	*1.70*	1.70	1.90	2.10
METALS:				
Copper, New York	**12.62½**	12.75	12.37½	12.37½
Spelter, St. Louis	**4.70**	4.70	4.65	4.80
Lead, New York	**4.60**	4.45	4.25	4.10
Lead, St. Louis	**4.45**	4.40	4.17½	3.97½
Tin, New York	*28.25*	28.50	28.60	29.10
Antimony, Hallett, New York	**6.75**	6.50	6.25	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	*3.84*	3.79	3.79	3.79

Chicago.

FISHER BUILDING, January 27, 1904.—(*By Telegraph.*)

After the fluctuations upward and downward the last six months, it is somewhat of a relief to chronicle a week that is without noteworthy change in price of any leading commodity. There is no denying that business is quiet, but it is by no means stagnant, and almost without exception the men whose opinion is worth anything in this market are looking forward to a good year's business under normal conditions, which may show a larger percentage of profit at the end of the year than was shown in the high pressure times of a year ago. There is little or nothing doing in Southern Pig Iron, and the fact that we restore prices to the $10 basis of two weeks ago must not be taken as an indication that a demand has sprung up for Southern Pig Iron, but rather that the recalcitrant ones who were giving away a freight profit to Northern customers have fallen into line with the leading factors, who have made the arbitrary price of $10, Birmingham, for No. 2, regardless of the law of supply and demand. As long as this price of $10 is held by Southern producers the Northern furnaces will continue to enjoy 90 per cent. of the trade in this market. Car builders, Agricultural Implement manufacturers and Fire Escape builders are buying Iron Bars freely and Steel Bars fairly so. Steel for the Ryerson Building has been let to the American Bridge Company by Wells Brothers, contractors, and a fair volume of Structural Steel is being placed with other mills and Structural shops. Plates are still quiet, buyres covering only their actual wants. Sheets are as erratic as ever, with the tendency toward higher prices on heavy gauges and lower prices on light gauges. Boiler Tubes and Pipes show no changes in price and no very great activity. Old Materials are still being arbitrarily advanced by sellers.

The prices quoted in our columns represent rather what is being asked by dealers and railroads than what is being paid by consumers. Taken all through, this has been a week of *status quo*.

Pig Iron.—Apparently the producers who have an advantage of 25c. in freight to Chicago from their furnaces in the South have ceased giving that advantage to Northern consumers here; one and all insist that no Pig Iron is being sold in the Chicago market for less than the basis of $13.85, Chicago, for No. 2. It is also true that an extremely small quantity of Southern Iron is being sold at that price, there being a deadlock between the seller and the buyer in this market on Southern Iron. What Iron is being sold from the Birmingham district must be going to other territories than this where competition of local furnaces is not so keen. Northern Iron continues to be sold on the basis of $14 for No. 2, either Chicago or Milwaukee delivery, a price that shows but a small profit to the Northern furnaces as compared with their cost sheets. A considerable tonnage of Northern Iron is moving on this basis, though the demand is anything but active, and a disposition on the part of the melters to contract far ahead is rarely in evidence. Just what either Northern or Southern furnaces would do with a customer who wanted a large tonnage for the last half of the year depends upon local conditions and upon the status of the customer, though the tendency, particularly among Southern producers, is to hold Iron for the second half of the year at about 50c. per ton above current quotations. Nothing definite has developed in regard to the pool which the daily newspapers state has been formed. There is a feeling in the market that a buying movement will begin before long, when leading railroad and agricultural implement interests provide for large tonnages of castings that they must have, but which they are holding back in the hope of lower cost for material and labor. We quote:

Lake Superior Charcoal	$16.75 to $17.00
Northern Coke Foundry, No. 1	14.50 to 14.75
Northern Coke Foundry, No. 2	14.00 to 14.25
Northern Coke Foundry, No. 3	13.50 to 13.75
Northern Scotch, No. 1	15.00 to 15.25
Ohio Strong Softeners, No. 1	16.30 to 16.55
Ohio Strong Softeners, No. 2	15.80 to 16.05
Southern Silvery, according to Silicon	15.35 to 16.35
Southern Coke, No. 1	14.35 to 14.60
Southern Coke, No. 2	13.85 to 14.10
Southern Coke, No. 3	13.35 to 13.60
Southern Coke, No. 4	12.85 to 13.10
Southern Coke, No. 1 Soft	14.35 to 14.60
Southern Coke, No. 2 Soft	13.85 to 14.10
Foundry Forge	12.85 to 13.10
Southern Gray Forge	12.60 to 12.85
Southern Mottled	12.35 to 12.60
Alabama and Georgia Car Wheel	.... to 19.85
Malleable Bessemer	14.50 to 15.00
Standard Bessemer	16.30 to 16.80
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	17.30 to 18.80
Basic Southern	14.35 to 14.85

Bars.—The withdrawal of several makers of Bar Iron from the market has given to the Republic Iron & Steel Company a very large tonnage in Iron Bars. They state that last week's sales aggregated a larger tonnage than was sold by them in any four weeks previous since the middle of last summer, and that the first 20 days of January, 1904, showed a tonnage exceeding that of any full month since August, 1902. Iron Bars are now held at 1.40c. pretty firmly, although one concern that is characterized by competitors as erratic now announce that they will sell at 1.35c., although they can deliver no Iron for the next three months, as their mill is greatly oversold. Steel Bars are moving in the even tenor of their way without showing a marked increase or decrease in tonnage as compared with last week. We quote: Iron Bars, 1.40c., half extras; Steel Bars. 1.46½c., full extras, both in carload lots, Chicago; Steel Hoops, 1.81½c. rates, full extras. From store Iron Bars are being sold at 1.60c. to 1.75c., full extras, and Steel Bars at 1.60c. to 1.75c., half extras, the lower price in each case being only for business that is exceptionally desirable, and is only quoted to large customers who buy extensively from store. Steel Hoops from store are still offered at 2.10c. to 2.20c. rates, full extras.

Structural Materials.—The contract for the Steel of the Martin A. Ryerson Building, at Adams and Market streets, requiring 1200 tons of Structural Shapes, has been let to the American Bridge Company by Wells Brothers, the general contractors. The same company have secured a large number of small buildings, and report business in their building department as being better than for a number of months. Other producers of Structural Shapes report that their business while not large is showing an encouraging growth from week to week. Mills that have Structural shops in connection enjoy an advantage over mills that can supply only the Finished Sections, as such low bids are now being made on Steel buildings as to leave but little margin above the cost of the bare Steel to pay for shop work. Where a year ago it was an easy matter to get $60 to $75 per net ton for the Steel frame work of buildings laid down ready to set, it is now said that $40 to $50 is more nearly the price that is going. Business in Light Angles, Beams and Channels, such as are used in car building, is exceptionally light, and will continue to be so until car builders get some car orders. The action of the railroads in delaying purchase of cars is so nearly unanimous as to lead some to suspect that an agreement exists to stay out of the car market until certain concessions are made that railroads would like to demand. The idea is often expressed, on the other hand, that steam railroads cannot afford to pay the prices that they once did for cars and equipment because of the increasing competition of electric railways in both freight and passenger traffic. At the same time no orders of startling magnitude are coming from electric railways to the car builders. Buyers of Structural Steel of every class adopt the waiting policy because they have convinced themselves that prices cannot go higher and that there will be but little difficulty in securing deliveries in a few weeks when they are ready to place their orders. Prices are unchanged. We quote: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, $1 per ton extra. Sales of Structurals are being made at 1.95c. to 2c. cut to lengths 5 feet and over, with here and there sales made at 1.90c. to large buyers.

Plates.—Business has not yet picked up in this line as it should have done, though it is by no means at a standstill, either from store or mill. We quote as follows: Tank Steel, ¼-inch and heavier, 1.76½c. to 1.86½c.; Flange, 1.86½c. to 1.96½c.; Marine, 1.96½c. to 2.06½.: Universal Mill Plates, 1.76½c. to 1.86½c. From store Plates are selling at 2c. for Tank quality, ¼-inch and heavier; 2.10c. for 3-16; 2.15c. for No. 8; 2.20c. for No. 10, with 25c. per 100 lbs. for Flange quality.

Sheets.—We revise last week's prices on Nos. 10, 12, 14 and 16, adding $1 per ton thereto, as there is a disposition on the part of makers of the heavier gauges to hold for the higher prices. It is true that Sheets in these gauges can be had at prices less than quoted, but only in the narrower sizes. On the other hand, we might almost take off $1 per ton from our prices on No. 24 and lighter, as so many independent mills are competing for these Light Sheets that the price is forced steadily downward. In the prices that follow the intervals between the various gauges are not adhered to uniformly, though the general result gives a fair average of the quotations being made in car lots, f.o.b. Chicago: No. 10, 1.86½c. to 1.91½c.; No. 12, 1.96½c. to 2.01½c.; No. 14, 2.01½c. to 2.06½c.; No. 16, 2.16½c. to 2.21½c.; Nos. 18 and 20, 2.21½c. to 2.26½c.; Nos. 22 and 24, 2.26½c. to 2.31½c.; No. 26, 2.31½c. to 2.36½c.; No. 27, 2.36½c. to 2.41½c.; No. 28, 2.46½c. to 2.51½c.; No. 29, 2.61½c. to 2.66½c.; No. 30, 2.71½c. to 2.76½c. We quote as follows from local warehouses: Nos. 8 and 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.30c.; No. 16, 2.40c.; Nos. 18 and 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.60c. to 2.65c.; No. 26, 2.70c. to 2.75c.; No. 27, 2.80c. to 2.85c.; No. 28, 2.85c to 2.90c. Galvanized Sheets are now being sold at no lower than 80 and 2½, f.o.b. mill, as far as can be learned, with some mills holding for 80 per cent. discount, at mill, in carload lots. Less than carload lots of Galvanized Sheets from Store, Chicago, are sold on the basis of 75 and 5 to 75 and 7½ discount from list.

Billets.—No sales of Billets of any magnitude have been made in this market during the week. Prices remain as for some time at $24 per gross ton, Chicago, for Open Hearth or Bessemer Forging or Rolling Billets.

Rails and Track Supplies.—One sale of 10,000 tons of Standard Sections was made for May and June delivery to a Western road, and other inquiries for 10,000, 7500, 5000 tons and smaller tonnages are being figured on. While the railroads have apparently decided that it is impossible for them to dislodge the Rail makers from their $28 position, they are disposed to delay buying until the last moment, feeling secure in their ability to get prompt shipment when they do want the Rails. Standard Sections are now being sold by all leading interests on a guarantee clause which gives the buyer the benefit of any reduction made by the pool on orders up to the time of the actual delivery of the Rails. This agreement is not retroactive, however, and Rails once delivered must be paid for at the contract price. There is some danger that this policy of delaying purchases will result in swamping the Rail mills by the rush of orders for quick shipment early in the spring, as a score of roads are only waiting for the frost to leave the ground before they make extensive repairs on their right of way. A feature of the Rail business is the volume, variety and sometimes the *bizarre* character of inquiries for Rails by electric roads. Promoters who can boast only of desk room in a real estate office, with a road on paper and neither surveys nor capital secured, will calmly send letters of inquiry for from 15,000 to 50,000 tons of Rails to all the leading Rail mills. However, from the mass of inquiries of this character there can be selected worthy inquiries for about 50,000 tons for electric roads, large and small, now, being figured on. Sections called for by trolley roads, both urban and interurban, range from 60 to 80 lbs. per yard. One thing that has enabled Rail mills to maintain so firmly their price of $28, in the face of declines in other Finished Steel products, is the fact that fully 1,000,-

000 tons, or half the normal consumption of Rails for the year, are already on the books of the mills of the country, either having been ordered last year for 1904 delivery, or ordered for 1903 delivery and subsequently posted forward on defer orders. On Light Rails $27 for 16 to 40 lb. is being asked and $28 for 12-lb., f.o.b. maker's mill, though Sections rolled from Old Rails can be had at a less price than this. Of Track Supplies, Angle Bars are being sold at 1.40c. to 1.50c., Spikes at 1.70c. to 1.80c., base, and Track Bolts at 2.50c. to 2.60c., base.

Merchant Steel.—There is some activity among Implement concerns in specifying on existing contracts, but very little is being done toward closing new contracts of any magnitude for materials of this kind. Prices remain unchanged, as follows: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.71½c. to 1.81½c.; Smooth Finished Tire, 1.66½c. to 1.76½c.; Sleigh Shoe, 1.51½c. to 1.61½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.01½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; Special Tool Steel, 12c. up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—Pipe business continues to be good compared with other lines of Finished Iron and Steel. Store business in Pipe is somewhat injured by the promptness with which mills are executing shipment. The leading producers quote the following discounts, f.o.b. Chicago, in carload lots:

	Steel Pipe.		Guar. Wrought Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛ to ⅜ inch	68.35	58.35	65.35	55.35
½ inch	71.35	61.35	68.35	58.35
¾ to 6 inches	75.35	65.35	72.35	62.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—At the present prevailing discounts common Lap Weld Steel Boiler Tubes are costing their users from 3½c to 4c. per lb. at Pittsburgh, and this is considered an extremely high price to pay for a product that can be manufactured on as large a scale and as economically as Tubes can be made by present processes. Buyers look back to the days when they were able to buy Charcoal Iron Tubes at 2c. to 2½c. per lb., or at about half the present price for ordinary Steel Tubes. Nevertheless there is a fair tonnage moving, and as the same price is made to all buyers, it is as fair for one as for another. There have been no changes in prices either from mill or store. The leading producer quotes the following discounts in carload lots from mill, f.o.b. Chicago:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	42.35	38.85	53.35
1¾ to 2¼ inches	54.85	37.35	40.35
2½ inches	57.45	42.35	up to 4 in.
2¾ to 5 inches	63.35	49.85	48.35
6 to 13 inches	54.85	37.35	....

Warehousemen have made no change in their discounts, which remain as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	40	35	37½
1¾ to 2½ inches	50	32½	35
2¾ to 5 inches	60	45	45
6 inches and larger	50	32½	..

Cast Pipe.—Orders have been taken recently for 1800 tons of Pipe for the city of Portland, Ore.; 1000 tons for the city of Seattle, Wash., and 1000 tons for the city of St. Paul, Minn. Municipalities are slower in covering their requirements this year than ordinarily. We quote: 4-inch Water Pipe, $27 per gross ton, in carload lots, Chicago; 6 to 12-inch Water Pipe, $26 per ton; Pipe larger than 12-inch, $25 per ton; Gas Pipe, $1 per ton higher.

Old Materials.—The advances in prices of Old Materials we have chronicled from week to week should not be taken as an indication of either a greatly increased demand or a lessened supply. On the contrary, the supply of Old Materials exceeeds the demand by a greater margin to-day than it did in December, owing to the fact that railroad companies are piling up, instead of selling, their Scrap. The railroad purchasing agents will send out their regular monthly bulletins asking for bids from all the recognized buyers of Old Materials. The bids are received in due time and a letter is promptly sent to each of them, stating that they did not offer enough money to secure the Material. Naturally each dealer or user of Scrap comes to the conclusion that prices are advancing, and the next time the railroad list reaches him he quotes a higher price. This tends to an artificial stiffening in the market. It is even said that this action on the part of the railroads is part of a general programme to force down the prices of Finished Steel products and to force up the price of Scrap in which the railroads are acting in concert. Beginning last October the increasing weakness in the Iron and Steel business led to gradual reductions in the price of Scrap. During this period most of the railroads sold on the declining market at very low prices, but about January 1 apparently an understanding was reached among the railroads to not sell at the low prices then going, and the strengthening in prices since January 1 has been accomplished as above indicated. As a matter of fact there has been offered for sale during the last 30 days a larger tonnage of Old Material than for six months previous, though the railroads have not seen fit to accept the offers made by the bueyrs for this material and are holding it for higher prices. The heavy snowfalls of the last six weeks have helped the railroads to maintain this position. It is true that a good many Steel Rails have sold in the Chicago market at a price considerably higher than was ruling in December, and this was due to the fact that a large local consumer had to have such Rails and was compelled to pay the advanced price to get delivery. As far as the dealers are concerned it must be remembered that part of the stock that they have on hand was purchased and stored months ago, when prices were much higher than they are now, and that dealers who have sufficient capital to carry this material are doing so rather than letting it go on the present market. At the same time the current requirements of leading melters of Scrap are being supplied by one dealer after another who is forced by financial reasons to close out his existing stocks at a decided loss compared with their cost. Were it not for this fact the advanced prices asked by dealers and railroads could probably be maintained in the face of even the present light demand. Advances of 50c. to $1.50 per ton are made on the following: Old Steel Rails, short and long lengths; Heavy Melting Steel Scrap, Mixed Iron and Steel Car Axles, Nos. 1 and 2 Railroad Wrought; No. 1 Dealers' Forge, Stove Plate and Light Cast Scrap, Railroad and Agricultural Malleable. We quote as follows, per gross ton, Chicago:

Old Iron Rails	$15.00 to $16.00
Old Steel Rails, 4 feet and over	12.50 to 13.00
Old Steel Rails, less than 4 feet	10.50 to 11.00
Heavy Relaying Rails, subject to inspection	23.00 to 24.00
Heavy Relaying Rails, for side tracks	18.00 to 20.00
Old Car Wheels	13.50 to 14.00
Heavy Melting Steel Scrap	10.50 to 11.00
Mixed Steel	9.00 to 10.00

The following quotations are per net ton:

Iron Fish Plates	$12.50 to $13.00
Iron Car Axles	16.00 to 16.50
Steel Car Axles	14.00 to 14.50
No. 1 Railroad Wrought	11.50 to 12.00
No. 2 Railroad Wrought	10.50 to 11.00
Shafting	13.00 to 13.50
No. 1 Dealers' Forge	9.50 to 10.00
No. 1 Busheling and Wrought Pipe	8.50 to 9.00
Iron Axle Turnings	8.00 to 8.50
Soft Steel Axle Turnings	8.00 to 8.50
Machine Shop Turnings	7.50 to 7.75
Cast Borings	4.00 to 4.50
Mixed Borings, &c	4.00 to 4.50
No. 1 Boilers, cut	8.50 to 9.00
Heavy Cast Scrap	10.50 to 11.50
Stove Plate and Light Cast Scrap	9.50 to 10.00
Railroad Malleable	8.50 to 9.00
Agricultural Malleable	8.00 to 8.50

In the case of Steel Car Axles the price of $9 to $9.50, published last week, was a typographical error and should have read $13 to $13.50.

Metals.—Pig Lead continues to soar, and the largest dealers are now paying 4½c. per lb. in 50-ton lots and 4.55c. for single car lots. Less than car lots are sold at 4.60c. to 4.75c., the latter price being the current quotation on ordinary less than ton lots. Pig Tin, after dropping to 20c., has advanced to about 30c., following its usual depression and rise before and after the monthly sale of Banca Tin by the Dutch Government. Casting Copper is ⅛c. weaker at 13c., with Lake 13¼c. Spelter is unchanged at 4.85c. in car lots and 5.10c. in less than car lots. Sheet Zinc is unchanged at 5.65c. per lb. for car lots 600-lb. casks, with 20c. advance for less than car lots. Old Metals have been steady at previous prices. We quote: Copper Wire and Heavy, 11¾c.; Copper Bottoms, 10½c.; Copper Clips, 10⅜c.; Red Brass, 10½c.; Red Brass Borings, 9c.; Yellow Brass, heavy, 8½c.; Yellow Brass Borings, 6½c.; Light Brass, 6c.; Heavy Lead, 4.25c.; Tea Lead, 3.85c.; Zinc, 3⅝c.; Block Tin Pipe, 24c.; Pewter, No. 1, 19c.

Tin Plate.—The leading producers are making little effort to sell Tin Plate at present prices, but are storing up current mill production against the rany day that is likely to come with the renewal of labor contracts in the spring. Independent mills are doing some business, but the trade in general is quiet. There is no likelihood of a repetition of last year's famine in Tin Plate, owing to the present small demand and to the fact that mills are piling up this material in tremendous quantities. At the same time should the mills be tied up by a labor dispute, and should the early spring show the prospect of a large crop of fruit and vegetables, the Tin Plate now being stored by the mills will barely be sufficient to meet the spring and summer demand.

Coke.—The highest priced grades of Connellsville Coke are now being sold as low as $4.90, Chicago, in carload lots, which would be $2.25 at the ovens, while some sales are made as high as $5 and $5.05, Chicago, or $2.35 and $2.40 at the ovens. On the other hand, 72-hour Foundry Coke

from the Lower Connellsville region and from the West Virginia regions is selling freely at $4.65, Chicago, or $2 at the ovens. A considerable quantity of Furnace Coke has come West, and has been placed for Northern blast furnaces, but with this exception no noteworthy activity has been shown in the Coke trade.

Philadelphia.

FORREST BUILDING, January 26, 1904.

The Iron market appears to be "marking time" temporarily. In spots there is a little more activity, but, taking everything into account, no distinct progress is being made. Prices are unchanged, and, so far as can be seen, are likely to remain so indefinitely. The only chance for lower prices appears to be in Pig Iron, but as they are already down to actual cost, producers consider that any further decline would simply close up a lot more furnaces. Against this, however, it must be remembered that stocks of Iron are increasing, and unless there is a reversal of that condition the ultimate outcome must be a lower range of prices. Of course a very moderate increase in the demand would help things wonderfully, but it will have to come pretty soon to be effective. The market is in a condition to give prompt response to either good news or bad news, but it can hardly remain in the half dead and half alive condition in which it has been for several weeks past. In some respects there appears to be a fairly good foundation for improvement, one being the exceptionally favorable turn in the money markets, based on the splendid returns from the cotton crop and agricultural products generally. As an offset to this, however, is the inordinate demand for money for refunding and for the completion of plans which have been more or less held up on account of the financial stringency during the past several months. During the period of the recent great industrial activity money was poured into the mills and workshops instead of, as at present, into bonds and other securities, and while there may be a partial return to the conditions first named, there is no probability that it will be in the immediate future or on a very large scale. The demand for rolling stock or for road purposes gives very little promise of activity during 1904, and as these industries are invariably the foundation of the greatest activity, it will hardly be safe to figure very heavily in that direction. The building trade, agricultural Implement trade and other important although minor industries will probably be about normal, but there are no evidences of any such extraordinary demand as was met with during the past three or four years. The prospective business during 1904 would be highly satisfactory for a productive capacity such as that of 1899 or 1900, but with our present facilities anything less than an 18,000,000 to 20,000,000 ton consumption of Pig Iron will leave a good many open spaces, and to get back to a 15,000,000-ton consumption will require a great deal more business than is in sight at the present time. Taking the furnace reports of the past three months as a basis, it does not appear that the aggregate consumption of Pig Iron has been quite 1,000,000 tons per month, so that to get back to 1,250,000 tons will require a very decided quickening in the demand. It looks as though some such increase will be necessary to maintain to-day's level of prices, and without at least some substantial recovery in the demand prices will probably have to go lower. A reduction in the price of Rails might throw a great deal of other business on the market and give just the stimulus which is needed, but it is clear that something will have to be done to give things the right kind of a start.

Pig Iron.—A fair average of business has been done during the past week. Some report quite an increase, others, however, appear to have done little or nothing. Prices have an easy tone, although there is no appreciable change from last week, and in most cases sales were at from $14.75 to $15, delivered, for No. 2 X Foundry. Gray Forge sold in moderate quantities at about $13.50, and Basic at $13.85 to $14.10, price varying according to quantity, point of delivery, &c. Sales were mostly for February and March shipments, there being very little disposition to go beyond that date. Two or three weeks ago Southern Irons were quoted at higher figures for the second and third quarters, but they are now quoted $10, f.o.b. cars, furnace, for any date that buyers wish to specify. There are very few sales, however, and it would probably require a liberal concession to secure a good sized order. But there is nothing in the situation to indicate any pronounced tendency. A little more demand would easily stiffen the market, while two or three weeks of dullness would be just as likely to weaken it, and as there is nothing to show whether the demand is likely to be better or worse, opinions in regard to prices are necessarily of very little value momentarily. For the present, quotations for city and nearby deliveries are about as follows:

No. 1 X Foundry	$15.50 to $16.00
No. 2 X Foundry	14.50 to 15.00
No. 2 Plain	14.00 to 14.25
Southern No. 2, rail shipment	13.75 to 14.00
Southern No. 2, on dock	13.00 to 13.50
Standard Gray Forge	13.50 to 14.00
Ordinary Gray Forge	12.75 to 13.25
Basic	13.75 to 14.10

Steel.—There is quite an active demand for Steel, and a very considerable tonnage has been placed during the past week. Prices are steady, with sales at $24.25 to $25, delivered, according to quantity, analysis, &c.

Plates.—Large orders are not numerous, but the demand for small and medium sized lots has been very satisfactory, and mills have made some nice additions to their order books during the past week. There is plenty of room for improvement, however, and buyers can be promptly accommodated as regards deliveries. Prices steady and unchanged as follows:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼ inch and heavier	1.73½	1.78½
Tank Steel, 3-16 inch	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.	1.98½	2.03½
Flange or Boiler Steel	1.83½	1.88½
Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
Plates over 100 to 110 inches	.05 per lb. extra.	
Plates over 110 to 115 inches	.10	"
Plates over 115 to 120 inches	.15	"
Plates over 120 to 125 inches	.25	"
Plates over 125 to 130 inches	.50	"
Plates over 130 inches	1.00	"
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10	"
Complete Circles	.20	"

Shell grade of steel abandoned.

Structural Material.—Business is picking up a little, and mills are getting more orders than for some time past, although specifications come in rather slowly. The outlook for the spring and summer trade is very satisfactory, however, and it looks as though there might be a good deal of activity in the near future, but orders can be promptly filled at unchanged prices—viz.: 1.73½c. to 1.85c. for Beams, Channels and Angles, according to specifications; small Angles, 1.45c. to 1.50c.

Bars.—Bar Iron is doing better and mills are getting in considerable business, although, of course, there is plenty of room for more. The feeling is a trifle stronger, and although prices are irregular, 1.35c. appears to be the bottome for best Refined Iron; there are others at 1.25c. to 1.30c. Steel Bars unchanged at 1.43½c. to 1.50c.

Sheets.—The mills are doing better than for a long time past, full time being required to keep up with the demand. Thick Sheets are specially active, although the demand for light gauges shows considerable improvement.

Old Material.—The demand for Steel Scrap is hardly as brisk as it was, but holders ask $13, delivered, and are said to find buyers at about that figure. All descriptions are in demand, however, and prices have made a decided advance during the past two or three weeks. Bids and offers are about as follows for deliveries in buyers' yards:

Old Steel Rails	$12.50 to $13.00
Heavy Steel Scrap	12.50 to 12.75
Low Phosphorus Scrap, nominal	16.00 to 17.00
Old Steel Axles	15.00 to 16.00
Old Iron Rails	15.50 to 16.00
Old Iron Axles	15.50 to 16.50
Old Car Wheels	13.00 to 13.50
Choice Scrap, R. R. No. 1 Wrought	15.50 to 16.50
Country Scrap	13.50 to 14.50
Machinery Scrap	12.75 to 13.25
No. 2 Light Scrap	11.00 to 11.50
No. 2 Light (Ordinary)	9.00 to 9.50
Wrought Turnings	9.00 to 9.50
Wrought Turnings, Choice Heavy	10.00 to 10.50
Cast Borings	7.00 to 7.50
Stove Plate	10.50 to 11.00
Wrought Iron Pipe	10.50 to 11.50

Cincinnati.

FIFTH AND MAIN STS., January 27, 1904.—(*By Telegraph.*)

In Southern Iron little or nothing is doing. All the selling houses agree that the work has been of the dullest for many months. So far as can be learned trade in Southern Iron has been confined exclusively to small lots of Soft Irons. These are in some demand, but the mill grades are decidedly inactive. The feature of the week has been the determined effort the Ohio furnaces are making for business. There has been considerable tonnage of Northern Iron sold at prices which in favored localities are below the prices of Southern Iron based on $10 for No. 2 Foundry, at Birmingham. The Ohio furnaces seem to feel that they have left the field too long to the Southern Iron masters, and that they should make every possible exertion to remain and hold their trade. Northern Iron at anything like even figures has a preference over Southern metal, as consumers can get it so promptly after ordering. There was during the past week 600 tons of Northern No. 2 Foundry sold, delivered Piqua, for $13.35. There is an apparent anxiety on the part of each Northern furnace to secure all the business within reach, and quotations are therefore somewhat irregular and prices uncertain. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$13.00 to $13.25
Southern Coke, No. 2	12.50 to 12.75
Southern Coke, No. 3	12.00 to 12.25
Southern Coke, No. 4	11.50 to 11.75
Southern Coke, No. 1 Soft	13.00 to 13.25
Southern Coke, No. 2 Soft	12.50 to 12.75
Southern Coke, Gray Forge	11.25 to 11.50
Southern Coke, Mottled	10.75 to 11.00
Ohio Silvery, No. 1	16.15 to 16.65
Lake Superior Coke, No. 1	14.15 to 14.40
Lake Superior Coke, No. 2	13.65 to 13.90
Lake Superior Coke, No. 3	13.15 to 13.40

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$18.75 to $19.00
Lake Superior Car Wheel and Malleable	18.75 to 19.00

Coke.—Coke is in abundant supply, with only moderate demand, as most furnaces have purchased their supply for several months to come. We quote at ovens, West Virginia Coke, from $2 to $2.25; Connellsville Coke, $2.10 to $2.35.

Plates and Bars.—The market is featureless, except it be that the demand for Iron Bars shows a somewhat firmer tone, and some very good sales are being made at these quotations. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.35c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, carload lots, 1.43c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.63c., in carload lots.

Old Material.—There is very little activity in this department. Consumers are very conservative in their buying and the status of the market is about as it has been for several weeks past. We quote, dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $10.50 to $11 per net ton; No. 1 Cast Scrap, $10 per net ton; Iron Rails, $13 to $14 per gross ton; Steel Rails, rolling mill lengths, $10 per gross ton; Iron Axles, $15 per gross ton; Car Wheel, $11 per gross ton; Heavy Melting Scrap, $9.75 to $10.25 per gross ton; Low Phosphorus Scrap, $11.50 to $12 per gross ton.

Birmingham.

BIRMINGHAM, ALA., January 25, 1904.

Measured by the volume of transactions during the past week the Iron market could only be reported as inactive. It could not be called dull, because there was a moderate business during the week. But the volume of business transacted was only of moderate dimensions. The condition excited no comment and caused no nervousness, for nothing else could be expected after the great wave of buying that so lately distinguished the market. There was no weakening in prices. What was priced was on the basis of $10 for No. 2 Foundry, and what was sold was on that basis. In a few instances the sales amounted to or were very near the output, but the majority of sellers did not do this well. There could have been a larger volume of business done had the furnace interests gone for the orders, but they contented themselves with letting the market run itself and with taking care each of its own trade. They are all interested in the evening up process and finding out just where they stand in the matter of stocks and deliveries. For the time being shipments are engaging the greater part of their attention and they are as heavy as facilities permit. As a rule cars are furnished with reasonable promptitude, and there is no delay in meeting matured deliveries. There were some reports to the purport that there was some weakness in the lower grades of Iron, but your correspondent found no confirmation of the report in the registered orders of the sales books he saw. There has been no active demand for these grades, and one might say there has not been the usual relative proportionate demand, but all understand the reason for it, and think that the discrepancy will soon be rectified by the resumption of the mills that use these grades largely.

There were no large orders during the week. A large part of the business was in the ordinary "due course" and in the shape of mail orders, where the business is entered at current value of the market. In volume the orders ranged from 1000 tons down to car lots, with the majority running from 100 to 500 and 600 tons. As a rule they all clamored for prompt shipment, showing that this class of buyers were as yet carrying no surplus stocks. So the market can be classed, so far, as healthy, with but a moderate business. It was absolutely without further feature and there was an entire absence of mutual accusations concerning cut prices, and there was nothing on this score from any of the buying markets, which is evidence conclusive that none of it was being indulged.

There is nothing to be reported about sales for the second quarter delivery. There were a few inquiries, but as far as your correspondent could ascertain there were no sales. The indisposition to sell for that delivery on basis of current value still prevails. But the time is close at hand when price must be fixed for that delivery, and it then will be the leading feature of the market.

There was a change in one of our important industries the past week. The Bates Metal Works transferred their plant to the Ajax Metal Company of Philadelphia, who have taken charge. The new corporation are an offshoot of the Philadelphia parent and are capitalized at $30,000, with J. G. Hendrickson as president, George Summers as vice-president and treasurer, and H. L. Carpenter as secretary. The capacity of the plant will be increased at once. The Hood Machine Works also changed ownership during the past week, the purchasers being the parties interested in the Steel Castings plant, about which you have been informed. Messrs. McWane of Lynchburg and Adams of Corinth are the active parties in the deal. They will add a Steel Castings department to the works and will be able to go right ahead, as the shops are well supplied with the machinery necessary for the proper conduct of a machine and foundry business.

A new Coal company called the Red Feather Coal Company were incorporated the past week, with John W. Miller as president, H. W. Percy as vice-president and T. B. Percy as secretary. They are capitalized at $20,000, and their headquarters will be here.

Some time ago these letters chronicled the fact that a large plant would be erected here in the district for the manufacture of trolley street cars. At that time it was supposed that North Birmingham would get the plum. But the progressive little city of Ensley offered inducements that secured the coveted prize and it has been decided to build there. This decision was reached yesterday and the matter of location is closed. The name of the corporation is the Southern Street Car Mfg. Company. They are incorporated under the laws of Virginia and the capital for their operation comes from New York and Virginia. The erection of the plant will commence within 30 days. W. G. Pilkinton is president, and J. W. Gilliam is secretary and treasurer. Both will reside here. The company were organized with a capital of only $50,000, but this will shortly be increased to $500,000. A two-story building, 300 x 300 feet, will be erected for the shops proper, and these will be added to as occasion requires. The company signed an agreement to employ at the start not less than 300 men, but the president states that they will commence with not less than 1000 men, and that the number will speedily be increased to 2000 men.

Concerning the reports in circulation about the furnace combine, all that one can say is that the matter is now under consideration in New York by the parties who are most affected by it. What progress, if any, has been made, no one here knows. Beyond the fact that interested local parties with their counsel are there on the ground in attendance at the meeting, nothing is known. But your correspondent hazards the prediction that a straight out purchase of the interests opposing the scheme is the only way to put it in successful operation. It's a case of "money talks."

Pittsburgh.

PARK BUILDING, January 27, 1904.—(*By Telegraph.*)

Pig Iron.—The Pig Iron market is not in very satisfactory condition, the demand being dull and prices somewhat weak, especially on Foundry Iron. It is evident that stocks of Iron in consumers' yards are very low, as most of the buying is for immediate delivery. There is a fair amount of inquiry for Foundry Iron, but when actual sales are made buyers usually get the benefit of low prices. While Northern No. 2 Foundry Iron is generally quoted at $13, Valley, or $13.85, Pittsburgh, yet actual sales have been made at $12.75, Valley, and in some instances this has been shaded. Bessemer Iron is quiet, and while usually quoted at $13, Valley, yet on a firm offer it is probable that $12.75 could be done. Forge Iron is very dull and is normally $12.75 and $12.85, Pittsburgh.

Steel.—The market is very quiet, and a very limited tonnage of Billets, Sheet and Tin Bars is sold at official prices. Most consumers are covered by special contracts, which enable them to get their Steel at $2 to $3 a ton under official prices.

Coke.—We note quite a heavy demand for Foundry Coke, and shipments are heavier than for some time. Strictly Connellsville 72-hour Foundry Coke is held at $2.10 to $2.25 a ton, at oven. Owing to the starting up of so many blast furnaces of the Carnegie Steel Company since the first of the year the H. C. Frick Coke Company will not be as large sellers of Furnace and Foundry Coke in the open market as they anticipated they would be some time ago. This concern will sell only a small part of their Coke to outside interests.

(*By Mail.*)

Nothing of special interest has developed in the Iron trade since our last report. We can note a very active demand for Coke, also for Wire, Wire Nails and Tin Plate. The Pig Iron market is somewhat quiet, sales being confined mostly to small lots, with the exception of Malleable Bessemer Iron, for which we understand some large contracts have been placed, deliveries in some cases running up to the end of this year. The Steel market is extremely quiet and practically all the Steel that is being sold is under contracts on a sliding scale basis, or else on other terms which make the prices of Billets, Sheet and Tin Bars considerably lower than the official prices. The high water in the Monongahela and Allegheny Rivers on Saturday and Sunday did an immense amount of damage by the closing down of plants and damage to machinery. On Sunday the Carnegie Steel Company had no less than 32 furnaces shut down on account of high water, but most of these are again in operation. Finishing mills in the Pittsburgh district along both rivers were submerged and a good deal of injury was done to machinery. A very heavy demand has sprung up for Foundry Coke, and some of the leading Coke producers have entered some large orders in the last few days. The fact that the foundrymen are heavy buyers of Coke indicates that their foundries are in operation, and this ought to result in an improved demand for Pig Iron before long.

Ferromanganese.—The market on Ferro is somewhat demoralized as to prices and English Ferro is sold at $42, delivered in the Philadelphia district. The price of domestic Ferro is about $45, Pittsburgh, or probably less, if any large tonnage were offering.

Steel Rails.—The report that a number of leading railroads had gone together and made up contracts for 1,500,000 tons of Rails, which had been offered to the United States Steel Corporation at $26 is officially denied. It is stated that there has been no change in price of Rails, and they will remain at $28. The impression prevails, however, that the strong position taken by the railroads against the price of $28 for Rails will cause the mills to make a reduction. Very little new tonnage is being placed.

Plates.—A fair amount of tonnage in Plates is being placed, but large contracts are lacking. Buyers are pursuing the policy of placing orders for small lots only and for actual wants. For 10, 12 and 14 gauge Plates, the Sheet mills are taking a good deal of tonnage and at comparatively low prices. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauge Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—The Sheet trade is fairly active, there being a good deal of inquiry and a good deal of tonnage has been booked for future delivery. It is confidently believed that the demand for Sheets will steadily show improvement, and will be quite heavy during February and March. We quote No. 26 Black Sheets, box annealed, one pass through cold rolls, at 2.10c. to 2.15c., No. 27 at 2.15c. to 2.20c. and No. 28 at 2.25c. to 2.30c., f.o.b. cars at mill. These lower prices on Sheets are made only on desirable specifications and for large lots. Galvanized Sheets are generally quoted at 80 and 2½ per cent. off, but for desirable orders 80 and 5 per cent. is being done. In net prices the latter discount is equal to 2.85c. for No. 26, 3.04c. for No. 27 and 3.23c. for No. 28. These prices are for carloads or large lots, f.o.b. at mill.

Structural Material.—The low price made on the Cambridge bridge, at Boston, will probably result in the railroads becoming more interested in the Structural market and placing contracts for bridges and other equipment that otherwise would have been held over. A good deal of tonnage is in sight, and some of it is expected to be placed in the near future. A good many small contracts are being given to the mills which foot up considerable tonnage. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Iron and Steel Bars.—The market on both Iron and Steel Bars is quite firm, and considerably more business is being placed than in December. We are advised that some of the mills rolling Iron Bars are disposed to name higher prices. Tonnage in Steel Bars is picking up, and we note the closing of a few contracts. We quote Common Iron Bars at 1.25c., at mill, for ordinary specifications, but for specially desirable orders possibly a little lower figure would be named. We quote Steel Bars at 1.30c., Pittsburgh, in carloads and larger lots. For quantities less than 2000 lbs. and not less than 1000 lbs. the price is 1.40c., and for less than 1000 lbs. the price is 1.50c.

Merchant Steel.—This trade is rather quiet, consumers placing orders only for small lots and actual needs. While some of the leading mills are fairly well filled up, others are very short of work. Prices are only fairly firm, and for desirable orders our quotations might be slightly shaded. We quote: Tire Steel, 1.50c., base, for usual sizes; Toe Calk, 1.85c., base; Sleigh Shoe Steel, 1.45c. to 1.50c.; Open Hearth Spring, 1.90c. to 2c.; Cutter Shoes, tapered and bent, 2.25c. The above prices are for carload lots at mill, the usual differentials being charged for small lots. Tool Steel is 6c. to 8c. for ordinary grades. Prices on Shafting are firm on the basis of 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Spelter.—The market is rather quiet, and prime grades of Western Spelter are held at 4.75c. to 4.80c., Pittsburgh, for prompt shipment. On orders for future delivery lower figures would be named.

Wire Rods.—The market is fairly active, and the two leading local interests are quoting $30 for Bessemer and Open Hearth Rods, f.o.b. at mill.

Railroad Spikes.—The demand is fairly active and a fair amount of tonnage is being placed with the mills. We quote at $1.70 to $1.75 per 100 lbs., f.o.b. Pittsburgh.

Skelp.—The market is extremely quiet, and we do not hear of any tonnage moving. We quote Grooved Iron and Steel Skelp at 1.40c. to 1.45c. and Sheared Iron Skelp at 1.45c. to 1.50c., f.o.b. at mill.

Merchant Pipe.—A moderate amount of tonnage is being placed, the demand for 6-inch and larger being quite heavy, but for the smaller sizes it is somewhat light. The tone of the Pipe market is firmer than for some time, and prices, in the main, are firmly held, being shaded only in exceptional cases and for desirable orders. Discounts to consumers in carload lots, on which the jobbers occasionally make slight concessions, are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galvanized.	Black.	Galvanized.
⅛, ¼ and ⅜ inch	70	60	67	57
½ inch	73	63	70	60
¾ to 6 inches	77	67	74	64
7 to 12 inches	71	61	68	58
Extra Strong, Plain Ends:				
⅛ to 8 inches	69	59	65	55
Double Extra Strong, Plain Ends:				
⅛ to 8 inches	61	51	57	47

Boiler Tubes.—A somewhat better demand is reported, and considerable tonnage is being placed for forward delivery. Prices to consumers in carloads, which are occasionally shaded, are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2¼ inches	55½	38
2½ inches	58	43
2¾ to 3 inches	64½	50½
6 to 13 inches	55½	38

Iron and Steel Scrap.—The market on Scrap is more active than for some time, especially Heavy Melting Stock. The recent advance of about $2 a ton on this material is being firmly held. We quote: Heavy Melting Scrap, $13 and $13.50, gross tons; No. 1 Wrought Scrap, $14, gross ton; Steel Rails, short pieces, $13 and $13.50, gross tons; Rerolling Rails, $15, gross tons; Machinery Cast Scrap, $12.50 and $13, gross tons; Cast Iron Borings, $5.50 and $6, gross tons; Turnings, $7.50 and $8, gross tons; Busheling Scrap, $10 and $10.50, net tons.

C. McKenney, formerly connected with the sales department of the Carnegie Steel Company, has associated himself with W. G. McKenney & Co., dealers in Iron and Steel Scrap, Twenty-eighth and Smallman streets, Pittsburgh. In addition to handling Iron and Steel Scrap and Second-hand Machinery, they will also take on Merchant Iron and Steel Bars.

The copartnership heretofore existing between Emmanuel Dreifus and H. N. Trimble, under the firm name of E. Dreifus, Trimble & Co., dealers in Iron and Steel Scrap, Farmers' Bank Building, Pittsburgh, has expired by limitation, and H. N. Trimble has retired. The business will be continued by Emmanuel Dreifus, under the firm name of Emmanuel Dreifus & Co., who will assume all contracts and all obligations of the former firm.

A. M. Brown and Ephraim Truxall, formerly of the Continental Iron Works, Wheatland, Pa., have organized the firm of A. M. Brown & Co., with offices in Rooms 600 and 601 German National Bank Building, Pittsburgh, and will carry on a general business as Iron and Steel brokers, handling Pig Iron and Steel Scrap.

H. N. Trimble, formerly of E. Dreifus, Trimble & Co., has retired from that firm and has organized the firm of H. N. Trimble & Co., to carry on a general business of dealers in Iron and Steel Scrap of all kinds, with offices in Rooms 1220 and 1221 Farmers' Bank Building, Pittsburgh.

St. Louis.

CHEMICAL BUILDING, January 27, 1904.—(*By Telegraph.*)

Pig Iron.—Some report a better volume of inquiry for Pig Iron for delivery from March to June, but for the most part the second quarter, April to June, is specified. Actual sales of a light order. A point remarked in the trade is the decidedly different disposition shown by the Southern as compared to the Northern furnace interests in the matter of quoting on supplies for future delivery. Southern interests are not inclined to name a figure on their product beyond the second quarter, while it is said a price to cover third quarter, and in some cases the whole year, can readily be obtained from the Northern companies. It appears that the feeling is quite strong on the part of consumers that price concessions will, perhaps, work in their favor later on, and they can't afford to delay purchases intended for future needs. Quotation of $9.75 to $10, Birmingham, for No. 2 Foundry about reflects the market. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry	$13.50 to $13.75
Southern, No. 2 Foundry	13.00 to 13.25
Southern, No. 3 Foundry	12.50 to 12.75
Southern, No. 4 Foundry	12.00 to 12.25
No. 1 Soft	13.50 to 13.75
No. 2 Soft	13.00 to 13.25
Gray Forge	11.75 to 12.00
Southern Car Wheel	19.50 to 20.00

Bars.—Business is said by jobbers to be quite brisk, and inquiry keeps showing an improving tendency. Trade is confined almost entirely to outside demand, on local call is very light, and prices are variable. We quote Iron, 1.50c. to 1.65c. and Steel 1.70c. to 1.75c. in lots from warehouse or store.

Angles and Channels.—Trade outside of the local demand is better with further improvement probable, judged by the volume of inquiry; local jobbers in Small Angles and Channels quote 3c. in lots from store.

Pig Lead.—The market has ruled firm and higher the past week, and recent sales have been made at 4.45c

Spelter.—Not very active conditions prevailing, but firmly held at 4.72½c., at which price sales have been negotiated.

Cleveland.

CLEVELAND, OHIO, January 26, 1904.

Iron Ore.—The Ore Association has not made a move toward setting a time for the meeting at which prices will be discussed. Meanwhile the consumption of the present stocks is very light, the movement away from the lakes to the furnace stock piles having been reduced to the minimum.

Pig Iron.—The buying of foundry Pig Iron seems to have improved slightly, but not enough to have tempted any idle furnaces, no stacks having been blown in during the week. The market presents an anomaly, the demand stiffening while prices have again dropped slightly. The general quotation for spot shipment is $12.75 to $13 for No. 2, Valley furnace, while good contracts can be had at $12.50, especially if they run over a considerable period. Southern makers are not getting much business in this field. The demand for Bessemer and Basic is appearing again. A few inquiries have come in, mostly for car lots of 100-ton lots, but hardly enough to coax out a price from the furnaces. The demand for coke improved somewhat with the recent flood disatsers, which made delivery very difficult. Good 72-hour foundry Coke brings $2.25 to $2.50 at the oven, while high sulphur Cokes range between $2 and $2.15. Good furnace Coke is selling at $1.50 to $1.60 at the oven. Pig Iron prices are quoted, f.o.b. cars Cleveland.

Northern Coke, No. 1 Foundry	$14.00 to $14.25
Northern Coke, No. 2 Foundry	13.50 to 14.00
Northern Coke, No. 3 Foundry	13.00 to 13.75
Southern Coke, No. 1 Foundry	14.25 to 14.50
Southern Coke, No. 2 Foundry	13.75 to 14.00
Southern Coke, No. 1 Soft	14.25 to 14.50
Southern Coke, No. 2 Soft	13.75 to 14.00
Jackson County, 8 per cent. Silicon	.... to 17.45
Hanging Rock Charcoal, No. 1	.... to 23.45
Southern Charcoal, No. 1	20.00 to 20.50
Lake Superior Charcoal	16.50 to 17.00

Finished Iron and Steel.—Smaller producers of Sheets have been cutting under the association prices rather vigorously during the past week. In some instances prices have been cut $1 and in others $2 a ton, while in other cases the difference has been that of the freight from the association mill to the market. The slashing has been so general that some of the association mill owners have been calling for a readjustment of the association price to meet the competition. Others, representing to the trade that prices have reached rock bottom, have been holding out against anything like a reduction. The quoted prices have not changed therefore, the association list being as follows: For No. 27 Black Sheets, out of stock, 2.50c.; for No. 27, One Pass Cold Rolled, in car lots at the mill, 2.35c.; for No. 22 and lighter, Galvanized Sheets, out of stock, 75, 10 and 2½ off list is quoted, while the heavier gauges are quoted at 75 and 10 off list. The demand for Steel Bars has been a little better, although the activity is more in specification against contracts than in new orders. The latter, however, are satisfactorily heavy, some few contracts coming in. Prices continue at 1.30c., Pittsburgh, for Bessemer, and 1.40c., Pittsburgh, for Open Hearth. Bar Iron prices have shifted again slightly, the Youngstown basis in most instances having been abandoned for a quotation of 1.30c. at the mill. The demand has not improved, as was hoped and expected. The call for Structural is a little better and a few contracts have been coming in, with satisfactory spot buying and with a better specification against contracts. The price holds steady at 1.60c., Pittsburgh. The Plate trade is lethargic. Some few of the industries, which seemed to promise new life in the near future, have not continued to display those signs of hope, and the market is rather narrower. The improved specification against contracts, however, continues. The price holds unchallenged at 1.60c., Pittsburgh. The electric lines, which are the principal Rail buyers, are waiting for money with which to carry on their improvements, and other buyers are holding off for price reductions. The railroad needs are light. There has been a moderate call for Billets, but mostly from the smaller concerns, where the demand is never very large. The price holds, despite talk to the contrary, at $23.50, Cleveland, for Bessemer, 4 x 4.

Old Material.—The market is a little stronger at the same prices for Material. The buying might be improved in some quarters. We continue to quote, all gross tons: Old Steel Rails, $14 to $15; Old Iron Rails, $16; Old Car Wheels, $13.50 to $14; Railroad Malleable, $12 to $12.50; Cast Borings, $5. All net tons: No. 1 Railroad Wrought, $11.50 to $12.50; No. 1 Busheling, $10 to $11; Wrought Turnings, $6 to $6.50; Iron Car Axles, $17 to $18; No. 1 Cast Scrap, $10.50 to $11.50; Stove Plate, $9 to $10.

New York.

NEW YORK, January 27, 1904.

Pig Iron.—Cast Iron Pipe makers have purchased some round lots of Pig Iron, and there has been quite a movement in Basic Pig Iron, at an advance in the price, due to special circumstances. Among the sales is one lot of 2500 tons to a New England plant. The United States Steel Corporation have ordered Basic Pig, purchased a considerable time ago from the leading Eastern makers for the Pencoyd works of the American Bridge Company, aggregating 12,000 to 14,000 tons, to be shipped to the Worcester works of the American Steel & Wire Company. This has created a temporary scarcity in the face of an unsatisfied demand, represented by quite a volume of pending inquiries. The Foundry Iron market is quiet and easy. The efforts of some of the Southern makers to get together have practically failed. We continue to quote: Northern No. 1 Foundry, $15 to $16; No. 2 Foundry, $14.50 to $15; No. 2 Plain, $13.75 to $14.25, and Gray Forge, $13.25 to $13.75. Tennessee and Alabama brands are quoted $14 to $14.50 for No. 1 Foundry, $13.50 to $14 for No. 2 and $12.75 to $13 for No. 3.

Steel Rails.—Aside from one lot of 10,000 tons for a road on the Michigan Peninsula no business of any consequence has been done in Standard Rails, the reports of large sales by the leading interest at a cut in prices being characterized as fairy tales. There is a moderate movement in Light Rails, which we quote at $25 to $27, according to section, while Standard Rails are quoted at $28. The Lackawanna mill will be rolling Light Rails in April.

Cast Iron Pipe.—The manufacturers are flooded with inquiries, surpassing any previous experience in January. A great deal of business is being booked, much of it privately. Among the notable public lettings of the past week was that at Brockton, Mass., for 1800 tons, the contract being secured by an Eastern independent company. Bidding on competitive work is stated to be very erratic. A low bidder on one contract may bid highest on another. Great variations are thus shown. Proposals will be received by C. C. Vermeule, 203 Broadway, until noon on April 2, for 10,441 tons of 24 to 4 inch Pipe, 185 tons of Specials, 279 Valves, 130 Hydrants, &c., for the water works of Cienfuegos, Cuba. Carload lots are quoted at $28 per gross ton for 6 to 10 inch, and $27 for 12-inch upward, at tidewater, with concessions on large quantities.

Finished Iron and Steel.—Small contracts in the Structural line are fairly numerous in all sections of the country. In this immediate locality the contract for the printing house of the Metropolitan Life Insurance Company, taking 1900 tons, has been closed, but nothing of greater importance has transpired. Those who contemplate enterprises of some moment are hesitating, as they believe that by waiting they may be able to do considerably better. The local Plate trade is reasonably active, but transactions are confined to lots of 100 tons or less. It is of interest to note that dealers are more disposed to stock up than for some time, being convinced that prices are not likely to be lower in the near future. The only tendency toward lower

prices is in Light Plates, which are rolled by both the standard Plate mills and some Sheet mills. When these can be furnished by the Sheet mills they are offered at much lower prices than by the standard Plate mills. Bar Iron manufacturers are enjoying a very good inquiry, local representatives of the mills reporting no difficulty in securing a good volume of business. Among the inquiries are many for contracts running for long periods, but these are not considered attractive at present prices. We quote at tidewater as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine, and 1.94½c. to 2.50c. for Fire Box, according to specification. Common Bar Iron, 1.30c. to 1.40c.; Refined Bars, 1.45c. to 1.60c., according to quality; Soft Steel Bars, 1.44½c. to 1.50c.

Old Material.—The market is less active, only small lots being in demand. Consumers seem to have largely covered their immediate requirements, and are again waiting for holders to reduce prices. Dealers apparently became very confident that the demand would grow heavier, and began to mark their prices up. Their disposition to take advantage of the slight improvement unquestionably checked its growth. Railroad companies were also influenced to look for higher prices, and they refused to sell at rates which would have moved their material. A feature of present conditions is that Relaying Rails seem to have gone out of favor in the East. Two Eastern railroad companies have for the past ten months been offering large lots of Relayers, but have been unable to dispose of anything more than very small quantities. Approximate prices per gross ton, New York and vicinity are as follows:

Old Iron Rails	$16.00 to $17.00
Old Steel Rails, long lengths	12.00 to 13.00
Old Steel Rails, short pieces	11.00 to 11.50
Relaying Rails, heavy sections	18.00 to ....
Old Car Wheels	12.50 to 13.00
Old Iron Car Axles	17.00 to 17.50
Old Steel Car Axles	14.00 to 15.00
Heavy Melting Steel Scrap	11.00 to 11.50
No. 1 Railroad Wrought Iron	12.50 to 13.00
Iron Track Scrap	12.00 to 12.50
Wrought Pipe	9.25 to 10.00
Ordinary Light Iron	7.00 to 7.50
Cast Borings	5.00 to 5.50
Wrought Borings	7.50 to 8.00
No. 1 Machinery Cast	12.00 to 12.50
Stove Plate	9.50 to 10.50

The New York office of the National Wire Corporation will be removed on February 1 to Room 1103 in the Engineering Building, 114 Liberty street. The New Haven mills are now in full operation, producing a large variety of Wire products, including Wire Rope, Galvanized Telephone and Telegraph Wire, Wire Strand, Tinned and Coppered Market Wire, Bright and Annealed Market and Stone Wire, Bright and Coppered Screw Stock, Tinned Mattress Wire, Black, Coppered and Liquor Drawn Spring Wire, and a great variety of special and miscellaneous Wires for the jobbing and manufacturing trade.

M. J. Drummond & Co., manufacturers of Cast Iron Gas and Water Pipe, have removed their sales offices from 192 Broadway to 182 and 184 Broadway, corner of John street, New York City.

Metal Market.

NEW YORK, January 27, 1904.

Pig Tin.—After a series of rather wide fluctuations the market at this writing has settled back to prices somewhat lower than the level it held a week ago. The lowest point touched during the fluctuation was 28c. This price was named for spot on Monday last. The London market also fluctuated considerably, but it showed a more marked tendency in the downward direction. As compared with last week's figures the London cable to-day showed a very heavy decline, being more than £2 lower. This is, however, half of the greatest decline of the week, which came on Monday and named £125 17s. 6d., as compared with £130 7s. 6d. of a week ago. The Banca sale, which was held in Holland to-day, realized the equivalent of 28.40c., c.i.f., New York. About 1900 tons were sold. The arrivals thus far this month amount to 2001 tons, and about 2435 tons are afloat. The closing prices here to-day are as follows: Spot and January, 28.25c. to 28.50c.; February, 28c. to 28.30c. London closed £127 15s. for spot and £128 5s. for futures.

Copper.—Prices have declined, but otherwise the situation is without change. The quotations given out by the producers and posted on the Metal Exchange are now as follows: Lake, 12.62½c. to 12.87½c.; Electrolytic, 12.50c. to 12.75c.; Casting, 12.37½c. to 12.62½c. Outside lots can be purchased at concessions from these figures of about ⅛c. The London market has declined more than £1 during the week, being cabled at the close to-day as follows: Spot, £56 12s. 6d.; futures, £56 10s.; Best Selected, £60 15s. The exports have been going on at even a greater rate than was expected. The month's shipments to date amount to 22,000 tons, and it is now estimated that the total for the month will reach 25,000 tons. Notwithstanding this heavy drain upon the available supplies the metal is freely offered, all of which is taken to indicate the existence of very ample stocks in the hands of producers.

Pig Lead.—Prices in London have declined to a point which very closely approximates the point at which the metal can be imported at a profit. Here quotations have stiffened, particularly as far as strict spot is concerned. This is now held at 4.60c. to 4.65c. by the merchants who have it on hand. The Smelting & Refining Company are now quoting February delivery, naming 4.50c. St. Louis telegraphs 4.45c. to 4.47½c. London is down to £11 11s. 3d.

Spelter—Is quiet but firm. Spot is quoted here 4.90c. to 5.05c., and St. Louis names 4.70c. London has advanced a shade to £21 12s. 6d. The best demand comes from the galvanizing trade, and particularly the Wire and Wire Nail branch.

Antimony.—More activity as regards this metal has been manifested during the last few days than is generally seen in months. As a result, prices have soared. Cookson's is now quoted 7.50c. to 8c.; Hallett's has jumped to 6.75c. to 7c., and other brands command 6c. to 6.50c.

Nickel.—No change is noted in this market, 40c. to 45c. being quoted for large lots, and 50c. to 60c. for smaller quantities.

Quicksilver.—The market is quiet, but steady. Flasks of 76½ lbs. are quoted at $47.50. London is quoted at £8 5s.

Tin Plates.—Another reduction in price has been made by the American Tin Plate Company. It amounts to 15c. per box and went into effect yesterday, when the cut was announced. It is reported in the trade that heavy shading of prices by the independent mills was largely responsible for the move. Quotations are now made on a basis of $3.45 per box of 14 x 20 100-lb. cokes, f.o.b. mill, equivalent to $3.64, New York. There is no change in the Swansea market, the quotation being 11 shillings 3 pence.

Our Pig Iron Production in 1903.

The official statistics of the American Iron and Steel Association for 1903, reports having been received from all the blast furnaces in the United States, show that the production was 18,009,252 gross tons. This was composed of 1,911,347 tons of anthracite and mixed anthracite and coke iron, 15,592,221 tons of coke iron, 504,757 tons of charcoal iron, and 927 tons of iron made from charcoal and coke mixed. Included in the production was 9,989,908 tons of Bessemer pig iron, 2,040,726 tons of basic pig iron and 192,661 tons of ferromanganese and spiegeleisen. The unsold stock on the market at the close of the year was 598,489 tons.

The Elyria Iron & Steel Company, having recently completed a mill at Elyria, Ohio, for the manufacture of products rolled from old steel rails, are now preparing to reroll rails into lighter sections. The plant consists of one 20-inch and two 16-inch mills, designed by the Wellman-Seaver-Morgan Engineering Company of Cleveland, O., at an approximate cost of $400,000. The plant has a daily capacity of 150 to 200 tons of structural shapes, pipe, tie plates, &c. They are now figuring on several large orders for light section rails, as it is their intention to go into the manufacture of this commodity very extensively in the future.

No. 1 blast furnace of the Lorain Steel Company, at Loraine, Ohio, has been blown in after a long shutdown. Within a very short time details will be announced of the merger of the Lorain Steel Company and the National Tube Company of Pittsburgh. The offices will be removed from Lorain to the Frick Building, Pittsburgh.

The annual report of the Standard Underground Cable Company of Pittsburgh, made public on Tuesday, shows net earnings for last year of $704,438.01, and a total surplus of $1,229,112.74. The report shows that the business has more than doubled during the year, and that it now uses 5 per cent. of the total copper production of the North American continent.

An automobile boat for the German Emperor will be built by the Chase Pulley Company of Bristol, R. I., on a design of Charles Herreshoff.

Labor Notes.

B. B. Noyes & Co. of Greenfield, Mass., have abandoned the heavy work in their foundry, because of trouble with the Molders' Union. The company formerly did considerable work for machine tool manufacturers, but this has now been given up. The attempt to unionize the foundry, which extended over a number of months, finally ended in the discharge of the union molders. The company have enough non-union men at work to do the light foundry work necessary in the manufacture of their regular lines of goods, which include the "Little Giant" blacksmiths' drills, foot vises, &c., which branch was recently purchased from the Wells Bros. Company of Greenfield.

Chicago chandelier manufacturers have as yet made no effort to resume work in their plants. They are a unit in stating that their plants will be closed indefinitely until business can be resumed on the open shop basis, as it is impossible for them to continue in business under the present drastic rules of the unions interested. About fifteen shops are thus closed, but most of the firms are taking care of their business by letting contracts to shops outside of Chicago.

Fearing that the employers are uniting for a concerted reduction in wages, the International Association of Machinists is making special preparations to withstand such action in case it materializes. The national officers of the association are instructing the various lodges and locals to "stand pat," if they meet with any attempt to reduce wages. George Preston, general secretary of the union, stated to a representative of *The Iron Age* that his organization was simply pulling itself together to stand in readiness to meet any efforts to lower wages, as he had information to the effect that reductions were threatened in various parts of the country, and in one city in particular. He said: "We believe that no good can be accomplished, and that the industrial situation will not be bettered in the least by a reduction in wages. Machinery builders have good-sized stocks on hand now, and any machinery they might build in the future, with lower-priced help, would not be sold now at lower prices, but would go to increase this stock and be sold at higher prices when the demand presents renewed activity. The cost of the necessaries of life has not decreased any, and it therefore costs our members just as much to live as it did during the times when manufacturers enjoyed a high degree of prosperity. We would rather have our men idle part of the time than suffer any disturbance of present scales. It will prove a very difficult matter for us to regain our present position should we forfeit it now. While I hope there will be no trouble, and that employers will be willing to allow present wages to stand, working shorter time, at the same time we want to be prepared in case the threatened reductions are made."

The Franklin, Pa., air compressor plant of the Chicago Pneumatic Tool Company is suffering a strike, due to an effort to effect a lower wage scale. This is the only plant of this company in which the union has a foothold.

Iron and Industrial Stocks.

The stock market showed a high degree of strength during the week, which was ascribed to powerful speculative interests who have for some time been working for higher prices. War news from the Orient was disregarded. An interesting fact was the advance on United States Steel preferred to 80 on Friday of last week, the highest price since October. Another noteworthy achievement was the advance in Can preferred, which steadily moved up from 33¾ on Thursday to 37½ on Saturday and Monday, the upward movement being attributed to prospects of another dividend. The common advanced from 4⅛ to 4½. Republic preferred also made a notable advance, rising from 43 to 49½. Sloss-Sheffield common advanced from 34⅞ to 38½. Tennessee Coal & Iron from 38½ to 40½, and the new Steel 5's from 74⅛ to 75½. The market did not maintain its full strength on Monday or Tuesday of this week, but the recessions were not particularly important. A special movement occurred in American Locomotive, which carried the common from 17⅞ on Thursday of last week to 23 on Wednesday of this week, and the preferred from 77½ to 80¼. The last prices on active stocks at 1.30 on Wednesday afternoon were as follows: Car and Foundry common 21⅛, preferred 71⅜; Locomotive common 21⅞, preferred 80¼; Colorado 33; Pressed Steel common 30, preferred 71; Railway Spring common 23¼, preferred 76⅛; Republic common 8½, preferred 47; Sloss-Sheffield common 38, preferred 79¼; Tennessee 40¼; United States Steel common 11⅝, preferred 58¼, new 5's 74½.

The A. L. Rich Company, Cincinnati, have recently offered for sale at $75 per $50 share $25,000 of the $70,000 12 per cent. common stock of the John Steptoe Shaper Company, whose business, established in 1845, consists of manufacturing machine tools, especially crank and geared shapers. The company own a new two-story brick plant. The preferred stock outstanding is 55,000. The net earnings were: 1900, $18,510; 1901, $17,342; 1902, $21,270. Alexander Dom is president and O. H. Broxterman secretary and treasurer.

It is interesting to note that investors who hold the common stock of the United States Steel Corporation are moving to form an organization that will request Andrew Carnegie to go into the directorate of the corporation to protect their interests. The suggestion is made by some of them that a reorganization plan should be submitted at the next stockholders' meeting of the corporation, whereby the present capital of common stock should be reduced to about 50 per cent., and, should the planned reduction be carried out, the reduced capital of common stock be placed on a 4 per cent. dividend basis.

The Colorado Fuel & Iron Company Committee, of which James A. Blair is chairman, has given notice to the holders of 5 per cent. ten-year convertible debentures that the time for deposit of these securities, which expired January 23, with the Continental Trust Company of the City of New York, under the refunding agreement dated December 11, 1903, is extended up to and including February 6, after which time no debentures will be received except upon such terms as the committee may impose.

The plan for the reorganization of the Consolidated Lake Superior Company, which the banking firm of Speyer & Co. have had under consideration since their purchase of the properties pledged to secure the Speyer syndicate loan at the foreclosure sale some weeks ago, is now nearly completed and will be announced probably during the coming week. The plan, it is understood, will provide for the participation of stockholders in the reorganization. It has been delayed for some time by reason of the willingness of the banking house to give the Philadelphia Reorganization Committee an opportunity since the foreclosure sale to raise the capital needed to put its plan into effect. Negotiations to this end have been pending with representatives of the Canadian Government, but the practical completion of the Speyer plan is taken as indicating that these have finally failed of accomplishing their purpose.

Dividends.—On January 22 the Thomas Iron Company of Easton, Pa., declared a semiannual dividend of 4 per cent., payable February 1.

Cambria Steel Company have declared the regular semiannual dividend of 1½ per cent., or 75 cents per share.

In the report of the State Appraiser, filed at the Surrogate's office in New York last week, concerning the estate left by William E. Dodge, who died on August 9 last, the following holdings appear:

Southwestern Investment Company, 20,400 shares	$1,530,000
Copper Queen Consolidated Mfg. Company, 52,447 shares	1,048,940
Ansonia Clock Company, 26,000 shares	500,000
American Brass Company, 4170 shares	417,000
Montezuma Copper Company, 9620 shares	481,000
Detroit Copper Mining Company, 10,000 shares	300,000
Lackawanna Steel Company, 2662 shares	191,664
Nacozari Railroad Company, 3400 shares	136,000
United Globe Mines, 6250 shares	187,500
First National Bank, 175 shares	105,000
North Star Mines Company, 20,000 shares	100,000
U. S. Steel Corporation, preferred, 200 shares	13,400
U. S Steel Corporation, common, 626 shares	12,520
Lackawanna Iron & Coal Company, 17 shares	850
American Can Company, 1925 shares	6,737.50
Auto-Vacuum Canning Company, 53 shares	530
Commercial Mining Company, 7100 shares	35,500
Calumet & Hecla Copper Company, 50 shares	21,250
Quincy Mining Company, 400 shares	34,000
Bisbee Improvement Company, 1476 shares	14,760
Dodge & Bliss Company, 327 shares	16,350

Mr. Dodge's share of the capital of Phelps, Dodge & Co. was $782,673.93, and it is estimated that the amount of his profits from the business of the firm from January 1, 1903, until August 9, the date of his death, was $27,248.53. The total value of the estate is placed at $7,114,298.92, of which $6,693,898.92 is personal property and $420,400 real estate.

The New York Machinery Market.

NEW YORK, January 27, 1904.

No change in the situation is to be reported. The volume of business has not increased very materially, although prospects have continued to improve. Prices are maintained fairly well in all lines, and so far as machine tools are concerned values continue to be held strongly.

A noticeable feature of the situation is the heavy demand promised for the near future due to recent conflagrations in several large well-known plants.

Owing to the fact that the work of the insurance adjusters is not completed, the plans of the E. W. Bliss Company of Brooklyn, N. Y., for the rebuilding of the portion of their plant destroyed by fire last Friday night have not been put in operation as yet. Temporary repairs have been made and the plant is in operation, a sufficient portion of it having been saved to permit continuance in a limited way. It is estimated that the loss will reach between $250,000 and $300,000. A large amount of this is due to water damage. The new six-story office building and machine shop was totally destroyed. The sixth floor of the building on the corner of John and Adams streets was completely gutted, and the lower floors of this building, with their immense quantities of machine tools, were seriously damaged by water.

It is the intention of the company to rebuild completely as soon as the insurance adjustment is completed. This will necessitate the purchase of a great deal of new machinery.

While the Ferracute Machine Company of Bridgeton, N. J., have not as yet completed the plans for rebuilding their plant, which, it will be recalled, was recently destroyed by fire, they have formed a general idea of what they will do. We are advised that the new plant will consist of a machine shop 100 x 200 feet, built as nearly fire proof as possible, together with other buildings, including pattern shop, forge shop and office building, to be built of slow burning construction. Oberlin Smith, the president of the company, is paying particular attention to the subject of equipment of the new plant, his intention being to profit to the greatest extent possible by the most modern appliances and methods giving efficiency and economy in production, and especially by the employment of high speed tool steels.

In connection with the rebuilding of their plant Kane & Roach of Syracuse, N. Y., advise us that they intend rebuilding on the present site at the earliest moment possible. The building that will take the place of the one destroyed will be about 160 feet long by about 115 feet wide, with a 40-foot extension two stories high. These buildings will be constructed so as to permit running electric cranes from one end to the other. There will be be about four traveling cranes in different sections of the building running from end to end, which will make this building with the brick part now standing about 260 feet long. About half of the roof surface will be skylight. The new building will be constructed of concrete and will be as nearly fire proof as possible. The company will have a modern up to date plant in every way. All the line shafting will run in roller bearings, and the machinery will all be heavy and up to date. A great deal of this machinery will be special and will be made by the company themselves. They expect to have the plant running in about three to four months if the weather permits.

The Reed Foundry Company of Worcester, Mass., are contemplating making a considerable addition to their plant in the spring. The present main building, which is 90 x 202 feet, will be extended to increase it about one-third, and the present office building will be extended to meet the main building, forming a two-story ell. The Reed foundry was built last year, and has been in operation only since spring, but the business has already grown to such an extent as to make increased facilities necessary. The company are employing a full force of men.

The Downes Machine Company of Salem, Mass., are making inquiries with a view to buying about $15,000 worth of machine tools.

When the Fay & Bowen Engine Company, now at Auburn, N. Y., are fairly settled in their new quarters they will be ready to purchase additional machinery for their new shops. The company recently incorporated with a capital stock of $40,000, and succeeded the firm of Fay & Bowen, manufacturers of gasoline motors and launches. They have purchased a tract of land in Geneva, with a frontage of 235 feet on the canal and 320 feet of lake frontage, where they will install a new plant. There now stands on the property a new building, 40 x 75 feet, which will be used as the nucleus of a boat shop, and they will construct at once a machine shop, 50 x 150 feet, part two stories. These with the test house, storage sheds, &c., will be sufficient to start, but further buildings will probably be erected after they are settled and know just where they can be located to the best advantage. The company's business has increased far beyond their present capacity, and with their new plant modernly equipped on Seneca Lake, which gives them ample opportunity to test any size of marine engine or boat they care to build, they will be enabled to largely increase their output and take much better care of their trade. The officers are: W. L. Fay, president and treasurer; E. L. Bowen, vice-president and general superintendent; W. C. Ware, secretary, and H. Brewer, engineer.

The work which C. C. Vermuele, consulting engineer, 203 Broadway, New York, has in hand will be productive of some nice orders for the trade for machinery and power plant equipment. Among those which will be placed within the next month or two is one for the water works for East Orange, N. J. Specifications are completed and Mr. Vermuele is about ready to receive bids for two 4,000,000-gallon pumps and three 150 horse-power boilers. Bids are also asked until March 15 for the construction and equipment of the Cienfuegos, Palmira & Cruces Electric Power & Railway Company's line, which will connect Cienfuegos, Cruces and Cumanayagua, Cuba. These proposals call for a large amount of construction material and contract work, including a 4000-foot tunnel, flume and power house on the Rio Hanabanilla, but do not include the power equipment. Bids will be asked later for a complete hydraulic installation to consist of four 1000-kw. generators, with the necessary horsepower of water wheels and accessories. This equipment will be contracted for probably in the spring, as it will take a long time to install it, and at the same time a complete machine shop outfit will be purchased for general repair work. It is expected that the road will be completed some time before the entire electrical equipment can be installed, and the company are preparing to operate it by steam for a time at least. The headquarters of the company are located in Havana.

Under bids opened December 15 for supplies for the Norfolk and Charleston navy yards the following awards have been made:

D'Olier Engineering Company, Philadelphia, class 1, one hundred and fourteen electric fans and a miscellaneous quantity of electrical supplies, $4900.90.

General Electric Company, Schenectady, N. Y., class 2, ammunition hoists and fittings, $4289.92; class 19, two electric deck winches, $2918.

Prentiss Tool & Supply Company, New York, class 20, one patternmaker's lathe, $598; class 21, one reciprocating power mortiser, $195.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until February 9 for a quantity of supplies for the Portsmouth, Boston, League Island and Washington navy yards, including electrical supplies, hydraulic jacks, traveling cranes, deck winches, drills, reamers, taps, &c.

The following awards have been made for supplies for the Mare Island and Puget Sound navy yards, bids for which were opened December 15:

Doubleday-Hill Electric Company, Pittsburgh, class 2, two No. 6 fan blowers, one spare armature and parts for motor, $698.

General Electric Company, Schenectady, N. Y., class 4, two electric motors, $305.

Henshaw, Buckley & Co., San Francisco, class 27, one gap lathe, $320; class 28, one double triple quick stroke shaper, $470.

Herron, Richard & McCone, San Francisco, class 29, one upright drill press, $92.

Halliday-Henshaw-Buckley Company, Portland, Ore., class 33, one pipe threading and cutting off machine, $529.

The following bids were opened January 19 for one 14-inch screw cutting lathe with 12-foot bed for the Annapolis Naval Academy:

Bidder 2, Fairbanks Company, Baltimore, Md., $556.

Bidder 3, Garvin Machine Company, New York, $534.

The following bids were opened December 30 by the inspector of the fifth light house district, at Baltimore, Md., for two marine boilers for the tail of the Horseshoe, Va., light vessel, No. 46:

McIntyre & Henderson, Baltimore, Md., $3700, accepted.

James Clark, Baltimore, Md., $4175.

Spedden Shipbuilding Company, Baltimore, Md., $4250.

Baltimore Shipbuilding & Dry Dock Company, Baltimore, Md., $4600.

E. J. Codd Company, Baltimore, Md., $4729.

We are advised that the notice sent to the trade last week by the Payne Engineering Company of 26 Cortlandt street, New York, was not intended to convey the impression that this concern would assume charge of the Western business of the Ashcroft Mfg. Company, the Hayden & Derby Mfg. Company, the Hancock Inspirator Company and the Consolidated Safety Valve Company; but was to serve as an announcement of the fact that H. S. Whitney and M. A. Hudson, who had been in charge of the New York office of the Payne Engineering Company, were to personally take charge of the Western business of the concerns mentioned.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, are reported to have secured a large contract through Jeremiah Head & Co. of London, England, for equipment to be installed in a large British iron and steel plant, which is to be remodeled on American lines.

Cincinnati Machinery Market.

CINCINNATI, OHIO, January 23, 1904.

If the exact situation as to conditions among the machine tool men of this city was actually known it would give one anything but an optimistic opinion of things in general. Surface indications point to the fact that trade has failed to put in an appearance at the time expected, and like the will-o'-the-wisp, has eluded the grasp of the different plants in this section of the country. There have been many reasons suggested as to why, in the midst of prosperity, with the mineral and agricultural resources of the country being developed as never before, this seeming uncalled for depression exists. Surely there is no lack of demand, and this certainly is not the real cause. With the railroads estimating on increasing their rolling stock and making extensive expansion in many of their shops commensurate with the immense tonnage which confronts them, why should trade at this particular time seem as if the bottom had dropped completely out?

The question seems to resolve itself into the fact that manufacturing life, the same as animal life, needs rest; so that after several years of strenuous exertion, when everything was keyed to its highest tension, throbbing and beating with the unusual demands of the time, what is more natural than that following this period should come a season of relaxation? Just how long this shall continue is a matter of grave doubt and uncertainty, but it is generally conceded that within the next 60 days a normal condition will prevail.

Some of our largest plants have practically shut down, with only enough men working to take care of any small orders that may come to hand. Pay rolls have in some instances been curtailed as much as 60 per cent., and the majority of the shops are working on short time. Prices, according to all reports, are being firmly maintained, it being argued that the margins of profit at present are so small that any cutting of rates would be a detriment rather than a benefit. The engine builders, who were among the last to feel the depression, have just begun to realize that all branches of the iron industry are similarly affected.

The structural iron men are adding few new contracts to their order books, and are also feeling the pressure of the times. This is possibly intensified by the fact that several of our larger buildings now being erected are constructed entirely of concrete, or are finished interiorly with this material. Take, for instance, the new American Book Company's plant on Pike street: The exterior is of brick and stone construction, while the arches, girders, joists, floors, &c., are to be of concrete. The necessity of bringing to an issue the comparative merits of the two substances to be used in the construction of modern fire proof buildings has at last brought matters to an issue. One of our well-known architects has been asked to make an official test, and subscriptions are now under way to raise the necessary funds, which will amount to about $3500, to carry out this plan. The concrete people will construct their building according to their own plans, and the structural iron men will erect one of steel, iron and fire proof brick, each building to be filled with highly combustible material and set on fire. Everything conducive to what shall be termed a fair test, such as draft location, &c., is to be provided, and it is expected that this vexatious controversy will be settled for all time. On the result of this test will depend of what material Cincinnati will in the future erect her skyscrapers and other spacious buildings.

The Cincinnati Milling Machine Company are feeling the general depression, and while they report inquiries more numerous and indications brighter, there is a lack of ability to bring prospective buyers to final conclusions. They anticipate, however, that a more normal condition will prevail within the next month or two, and trade will again be more satisfactory.

The Blymyer Mfg. Company are anxiously looking forward to the time when the difficulties in Panama shall be settled and trade opened up with that section of the country. They with others note quite a diminution of trade, but feel confident that existing conditions cannot possibly continue for any length of time.

The R. K. Le Blond Machine Tool Company have installed their new engine and generator, and their entire plant is now being driven from one central point. The milling machine trade is fairly active, and while in other departments they have inaugurated forms of retrenchment, in this particular branch they have made no change whatever.

The I. & E. Greenwald Company have until the present month experienced little difficulty in assuming that conditions of trade in their particular line were about as they had been for a year previous. This, however, is somewhat changed, and they, in line with others, are not at all satisfied with the present outlook. True, they are receiving numbers of inquiries, and things in general present a more cheerful aspect, yet there is the absence of that snap, indicative of life, which is desirable. On January 20 they held their annual meeting, electing the same officers to serve for the ensuing year.

The Bollman-Wilson Foundry Company report an improvement both at their Norwood and Cincinnati foundries. They are perhaps securing more than their share of current trade, and to them the future seems quite promising. They have recently received an order from the Cincinnati Water Works for furnishing 42 tons of castings made up of eight separate castings, each weighing about 5 tons, for controlling the heavy caissons being used in the construction of the new plant. This bid was awarded them at a very satisfactory figure in competition with ten or more others. Inquiries are being received from quite a number of places outside of Cincinnati, and they are adding very materially to their order books from this source. They have recently shipped to Peoria, Ill., a large consignment consisting of 12 carloads of rectifiers, and have ready to go forward six carloads of rectifiers for New Orleans, La.

The John Steptoe Shaper Company, unlike most others in this city, have not as yet felt the prevailing inactivity. They report that they are running full force and time, and have all that they can do. Foreign trade is opening up, and they recently had an inquiry for their tools from the Japanese Government for naval station purposes. They hope for a continuance of existing conditions, as they have no complaint to make whatever.

The annual meeting of the American Tool Works Company was held at the offices of the company on Tuesday, January 19, resulting in the election of the following directors: Franklin Alter, H. H. Peck, R. J. Smith, J. B. Doan and A. B. Voorheis. J. B. Doan is the new member of the board, taking the place of L. E. Voorheis, a son of A. B. Voorheis. Later the directors organized with Franklin Alter, president; J. B. Doan, vice-president and general manager, and Harry Luers, secretary and treasurer. The stockholders were exceedingly well pleased with the year's showing, and the management was congratulated accordingly. Trade at present is commonplace.

The Stewart Iron Works of Cincinnati have formally organized into three large corporations, with a total capitalization of $650,000. The three companies are as follows: The Stewart Company Steel & Iron Works, manufacturers of structural and ornamental iron work, capital $300,000, with W. A. Stewart president. This plant occupies the territory in Cincinnati bounded by Third, Fourth, Culvert and Eggleston avenue, formerly known as the Stewart Iron Works. The Stewart Iron Works Company, manufacturers of iron fence, lawn furniture, &c., capital stock $200,000, and the Stewart Jail Works Company, manufacturers of jail, prison, cell, fire and burglar proof vaults, &c., capital stock $150,000, with R. C. Stewart, Jr., president, occupy the new buildings recently erected by them in Covington, Ky., about ten minutes' ride by trolley from their Cincinnati plant. Each plant has excellent railroad facilities, the Cincinnati plant being on the line of the Pennsylvania Railroad and the Chesapeake & Ohio and Louisville & Nashville railroads, switching directly into their Covington plant. They have added new equipment, and the facilities are now such that their capacity for doing business has been more than doubled. All the companies have orders and contracts on hand which will control their time for some months to come. The object of organizing the three corporations was not for the purpose of selling their stock, as none will be offered on the market, but in order that they might separate and expand each branch of the business, which had largely outgrown the capacity of the Cincinnati plant.

At the yards of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., the protected cruiser "Charleston" was successfully launched January 23. The next launching will be that of the battle ship "Virginia," which is expected to go overboard in March. The other ships now on the ways at Newport News are the battle ships "Minnesota" and "Louisiana."

Frank C. Roberts & Co. of Philadelphia, engineers for Bolckow, Vaughan & Co., Limited, report that the construction work is well under way for the two furnace plants which this company are building at Middlesbrough, England. The steel work for both furnaces is practically completed, and the brick work has been started.

PERSONAL.

Frank L. Coventry, superintendent of the mines of the Republic Iron & Steel Company, on the Marquette range, has resigned from that position. His successor has not been chosen.

W. S. Chase, sales manager of the National-Acme Mfg. Co., of Cleveland, took passage on January 16 for England and the Continent on a business trip to cover about two months' time.

R. D. Wilkinson has been appointed superintendent of the Niles furnace, of the Carnegie Steel Company, Niles, Ohio.

E. H. Lynde, for many years connected as Bessemer and rolling mill superintendent with the Lackawanna Steel Company, has resigned.

T. C. King, formerly manager of the blast furnaces of the Chickies Iron Company, Chickies, Pa., but later known as the Standard Iron Mining and Furnace Company, has resigned his position and will open offices in London, England, as consulting engineer for the building of blast furnaces and iron and steel works.

H. M. Valentine, Philadelphia sales agent for the Bethlehem Steel Company, has resigned and W. B. Kennedy, who has for some time been connected with the company's Bethlehem office, has been appointed to fill the place thus vacated.

W. F. Bay Stewart has been elected president of the Norway Iron & Steel Company, York, Pa.

George Westinghouse sailed for Europe on Tuesday, by the North German Lloyd steamer "Kaiser Wilhelm II."

Capt. Henry Jewell has resigned his connection with the Oliver interests at Ishpeming, Mich., to accept the position of superintendent of mines of the Salisbury Steel & Iron Company, at Salisbury, N. Y.

Henry W. Oliver of Pittsburgh, who has been lying seriously ill at his home on Ridge avenue, Allegheny, for some weeks, has taken a turn for the worse and his condition is very critical. A specialist from John Hopkins Hospital of Baltimore has been called in consultation, and he does not hold out much promise of Mr. Oliver's recovery.

New Tin Plate Prices.—PITTSBURGH, PA., January 27, 1904.—On Monday, January 25, the American Sheet & Tin Plate Company of Pittsburgh announced a reduction of 15 cents per box on all grades of tin plate, effective on that date. This reduces the price of 100-pound coke plates from $3.60 to $3.45 per box flat. It is understood that stocks of tin plate in the warehouses of some of the leading mills are very heavy, and as tin plate was not moving as freely as desired, it was decided to make the reduction.

At the annual meeting of the shareholders of the Salisbury Steel & Iron Company, Utica, N. Y., directors for the ensuing year were elected as follows: Henry N. Clark, Boston; William Kerby and J. E. Morhardt, New York City; Hon. Titus Sheard, Little Falls, N. Y.; Judson W. Warner, Oneida, N. Y., and E. L. Wells and W. H. Switzer of Utica. The officers elected were J. W. Warner, president; Henry N. Clark, vice-president; W. H. Switzer, secretary and treasurer; F. R. Switzer, assistant treasurer. Marcus Ruthenburg was reappointed as consulting engineer. The annual report showed the company to be in a very satisfactory condition, with a large tonnage of high grade ore ready for shipment at their mines, Salisbury, Herkimer County, N. Y. This company are engaged in opening up the Salisbury mines as a large shipping proposition, and while the work of the past year has been primarily of a development and exploratory nature, the new shafts and levels have run in solid ore from the surface, opening up what has every indication of being a large deposit. The company have recently acquired additional mineral land, so that they now own outright, free and clear, 756 acres.

CONTENTS.

	Page.
The Norton New 14-Foot Grinding Machine. Illustrated	1
High Pressure Gas Distribution	4
The Birmingham Statue of Vulcan for St. Louis	4
A Substitute for Looped Hose on Traveling Air Hoists. Ill.	5
The Platz Method of Calculating Furnace Burdens	6
The New York Automobile Show	8
A New American 36-Inch Planer. Illustrated	9
American Interests in Russia	10
A New Reheating Furnace. Illustrated	12
The National Building Trades Employers' Association	13
The Canadian Parliament to Meet	14
A Boiler Letting Controversy in Chicago	15
The Cross & Speirs Power Foot Press. Illustrated	15
A New Charcoal Retort Plant. Illustrated	16
Some New Manganese Bronzes	18
Two Deliverances on Reciprocity	19
The Mietz & Weiss Two-Cylinder Marine Kerosene Engine. Ill.	20
Revised Boiler Regulations Desired	22
The Sand-Lime Brick Industry in This Country. Illustrated.	24
Stone, Lime and Cement Associations Meet	26
Conditions Which Surround the Iron Producer in the United States and Great Britain Compared.—I	27
The Armor Plate Contracts	30
Editorial:	
Patents and the Patent Law	32
The Development of the Central West	33
Prompt Iron Statistics	34
The Growth of Public Expenditures	34
The Rise in Cotton	35
The Scotch and Northern England Iron Trade	35
To Aid the Merchant Marine	36
Lake Superior Copper Production	37
Standard Tin Plate Company	37
The Massachusetts Labor Commission	38
Lake Mining Matters	39
Notes from Great Britain	40
The Youngstown Iron Sheet & Tube Company	41
Schonthal Iron & Steel Company	41
The German Iron and Steel Industry in 1903	42
Trade Publications	43
Manufacturing:	
Iron and Steel	45
General Machinery	45
Power Plant Equipment	46
Foundries	46
Bridges and Buildings	47
Fires	47
Hardware	47
Miscellaneous	48
The Iron and Metal Trades:	
A Comparison of Prices	49
Chicago	49
Philadelphia	52
Cincinnati	52
Birmingham	53
Pittsburgh	53
St. Louis	55
Cleveland	55
New York	55
Metal Market	56
Our Pig Iron Production in 1903	56
Labor Notes	57
Iron and Industrial Stocks	57
The New York Machinery Market	58
Cincinnati Machinery Market	59
Personal	60
New Tin Plate Prices	60
Hardware:	
Condition of Trade	61
Notes on Prices	62
Hardware Organizations:	
Pennsylvania Retail Hardware Dealers' Association	64
St. John Iron and Hardware Association	64
Chicago Retail Hardware Association	64
Iowa Retail Hardware Dealers' Association	64
Colorado Retail Hardware Dealers' Association	64
Philadelphia Hardware Merchants' and Manufacturers' Association. Portraits	65
Death of Edgar Underhill	70
Hardware Association Meetings	70
Van Camp Hardware & Iron Company	70
New Orleans Notes	71
A Unique Dinner Souvenir. Illustrated	72
Trade Items	73
Factory Cost and Business Methods. Illustrated	74
British Letter	76
Hardware Menu Bulletin Board. Illustrated	76
Requests for Catalogues, &c	77
Price-Lists, Circulars, &c	77
Hendricks Commercial Register	78
National Novelty Corporation	79
Miscellaneous Notes:	
Marble's Automatic Gaff Hook	79
Nichols Bros	79
American Tap & Die Company	79
Samson Butcher Block Steel Brushes. Illustrated	79
The Economy Revolving Nail Bin. Illustrated	79
Iron Age Horse Hoe No. 8. Illustrated	80
Badger Hay Carrier. Illustrated	80
The Johnson Bilge Pump. Illustrated	80
Perfect Handle Screw Driver. Illustrated	81
Reliable Automatic Door Check. Illustrated	81
Ever Ready Plato Clock. Illustrated	81
The Bonney Adjustable Alligator Wrench. Illustrated	82
Simplex Watchman's Clock. Illustrated	82
The O-hi-o Detachable Screen Door Hinge. Illustrated	82
Current Hardware Prices	83
Current Metal Prices	90

HARDWARE.

MANUFACTURERS recognize the necessity of keeping their plants in full operation in order to turn out goods at a minimum of cost. While they have learned that undue and excessive pressure on the producing facilities of a factory or mill is disadvantageous on account of increased wear and tear, and, therefore, ultimately of increased cost in the product, they are more apprehensive of idleness in either machinery or workmen. The latter would not be tolerated in any well-ordered establishment, and effort is constantly made to keep the machinery moving. Idleness here is waste of capital, and where it can be avoided is bad management. The representative manufacturer endeavors to keep the wheels of industry in motion, and his men not only employed but working to their full bent. In these days of growing narrowness of margins of profit the observance or the neglect of this principle has much to do with the manufacturer's success or failure.

The ordinary merchant is more apt than the manufacturer to overlook this principle as one which must always be borne in mind and persistently followed. It is, of course, recognized by the great jobbing houses, in which there is a steady pressure on all the machinery of the organization and things are kept going under systems or personal direction which seeks to call out from each employee the best and the most of which he is capable. There is little idle time in such well ordered establishments. In the smaller houses, and more especially those doing a retail trade, the case is too often different. Many merchants, doing, indeed, a profitable business, have some in their employ whose work is not as fruitful as it might be if it were properly utilized. It may be assumed that the regular routine of the store work is well taken care of—that there is no obvious neglect of any recognized duty; but if there is idle time on the hands of an employer or employee, the situation is analogous to a factory in which the machinery is inactive and workmen idle. It becomes the one charged with the responsibility of direction in such case to devise methods and lay down rules by which such waste time may be turned to account, and the productiveness of the store increased. This may require a revision of methods and the adoption of enterprise in many minor ways. If there is at the head of the business or in active management of it the requisite ingenuity and alertness, the ability to originate and devise aggressive and enterprising measures, the faculty of organizing things so that no time shall be lost, but that all along the line the best energies of all shall be utilized, the business will surely respond, as would not be the case with slow and easy going management. While the results of the business financially will justify such a course, the employees whose energies and abilities are thus evoked and cultivated will be given a better training and come forth in due time fitted to do much better work than if the years of their apprenticeship and early service were spent in an easy going establishment, which failed to respond to the exigencies of competition, neglected to make the most of opportunities, and was devoid of that life and push which contribute so much to the dignity and satisfaction as well as to the success of business life.

The last issue of the Bulletin, which is published by the National Retail Hardware Dealers' Association, is a striking indication of the position which has been attained and the good work which is being done by this organization. It is bristling with suggestiveness for the retail Hardware merchant, in regard to the conduct of his business and the efforts which are being put forth in the presence of the dangers which beset his interests. The Parcels Post bill, the catalogue houses, the selling of goods to consumers, Hardware trade insurance, the work of the association in its various phases, and other thoroughly live subjects are discussed in a clear and forcible way, making the issue exceedingly creditable to the association and of general interest to the trade. Prominent reference is very properly made to the presence of the officers of the association at the Atlantic City conventions, and the excellent work done in securing a practically unanimous vote of the great organizations represented there in opposition to the Parcels Post bill. The need of continued effort on the part of merchants to prevent the enactment of this unwise and mischievous measure is very properly emphasized.

Condition of Trade.

With the travelers on the road and the business which naturally belongs to this season, when preparations are being made for the spring trade, there is a perceptible movement of Hardware, and merchants are generally getting their stocks in order for the coming months. The facts which are brought out in official reports as to the extent of the country's exports are not only gratifying as indicating a rapidly growing volume of business, but significant of the important fact that in this way an outlet is to be found for American goods, thus relieving the home market when the production is in excess of the demand. This will probably be a substantial advantage during the present year and help to maintain prices above a level to which they might otherwise fall. The past week has witnessed little change in the matter of quotations, which continue fairly steady. Some changes are to be noted, but on the whole they are probably more in the direction of improvement than decline.

Chicago.

(*By Telegraph.*)

The demand for Poultry Netting, Wire Cloth, Garden Tools and other spring lines is exceptionally brisk. The fine sleighing all through the West permits farmers to come to town and discuss with their Hardwaremen their spring needs. Edge Tools, such as Hatchets, have been advanced. This is one of the lines that remained at its former price all through the boom of 1902 and 1903, and only now, after the boom is over, are prices being advanced. An active demand is reported from the country for Galvanized Sheets, and a fair demand for Black Sheets; Bars, Horseshoe Iron, and Horseshoes are selling only moderately, as this is between seasons for them. Nuts, Bolts, Washers are a little firmer in tone. Builders' Hardware is a little brighter, with an indication that country dealers and contractors are reconciling themselves to the many changes made in the lists early in the month.

St. Louis.

(*By Telegraph.*)

The amount of business coming to hand is large, but owing to the severe storms and continued cold weather, shipping facilities have been seriously interfered with the past week. Spring trade has opened up in good fashion, and the demand for the usual assortment of seasonable specialties, including Garden Implements, Hoes, Forks, &c., is encouraging. The South this year holds out particularly bright prospects for a betterment of trade conditions, and jobbers generally look with greater confidence to this section. The demand is im-

proving steadily for the heavier class of supplies, and while the local call is light that from outside sources evens up any discrepancy.

NOTES ON PRICES.

Wire Nails.—The very satisfactory condition referred to in our last issue still continues, and the recent advanced prices are well maintained, with a large volume of business. The leading independent manufacturers of Wire Nails and Wire, outside of the American Steel & Wire Company, met at the Grand Pacific, Chicago, January 21, to confer with reference to the general interests of the Wire and Nail industry. Manufacturers not attending personally were represented by letters in which they expressed themselves as being in accord with the ideas outlined in the call of the meeting. Markets in general were discussed, and while there was no agreement as to prices, it was agreed to adhere to the general values as made by the American Steel & Wire Company. Reports from every quarter indicated that prices, firm to-day, promised to be firmer during the winter and early spring, and that the demand for Wire goods is fully equal to the capacity of the mills to supply. The meeting was informal. There was no association and no plan proposed for the formation of an association, and whether a subsequent meeting will be held will depend upon future events. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95
Retailers, less than carload lots	2.05

New York.—The continued unfavorable weather for building operations keeps demand within quite narrow limits. The market is firm in tone, at the following quotations: Single carloads, $2.05; small lots from store, $2.15.

Chicago, by Telegraph.—The Independent Wire Nail manufacturers met in Chicago on January 21 and decided to follow the price schedule promulgated by the leading producers. The demand for Wire Nails and other Wire products is so active that there is every probability that independent mills can sell their whole output without cutting this price. Prices remain unchanged, as follows: Carload lots to jobbers, $2.05 per 100 pounds, Chicago; less than carload lots, $2.15; car lots to retailers, $2.10, all f.o.b. Chicago.

Pittsburgh.—Nothing of special interest was done at the meeting of the independent Wire Nail mills, held in Chicago last Thursday. We note a very heavy demand for Wire Nails, and the leading interests advise us they are well sold up for the next several months. It is still insisted that there may be trouble in getting prompt deliveries of Wire Nails in February and March, owing to the heavy demand. Prices are very firm and the mills are working very closely together. We quote Wire Nails at $1.85 in carloads to jobbers, $1.90 in carloads to retailers and $2 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—A larger demand is being felt, both because of the comparatively small stocks in the hands of the trade and the general feeling that prices may be higher before they are lower. Contract orders for future delivery are of considerable proportions. Quotations on Steel and Iron Nails, in all quarters, are as follows: $1.70, base, in carloads, and $1.75 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

New York.—The local demand continues limited, owing in some measure to the unfavorable weather. Quotations are as follows: Carloads on dock, $1.84½; less than carloads on dock, $1.92½; small lots from store, $2.

Chicago, by Telegraph.—A good business is done in this line, and there is considerable buying for future delivery on the part of Hardware dealers who believe that the price cannot go lower, while it may go higher. Jobbers buy Cut Nails at $1.86½, base, per 100 pounds in car lots, Chicago, with $1.91½ the base car lot price to retailers.

Pittsburgh.—Demand for Cut Nails has not shown perceptible increase since the recent reduction of 20 cents per keg in prices. Only a fair amount of orders is being placed, and this mostly for small lots for early delivery. It is expected, however, that demand for Cut Nails will soon show improvement, as it usually does at this season of the year. We quote Iron and Steel Cut Nails at $1.70, base, in carloads, and $1.75 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

Barb Wire.—There is a very heavy demand in the West, and indications are that mills will soon be taxed to their full capacity to fill orders promptly for the spring trade. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago, by Telegraph.—The excellent crops harvested west of the Mississippi River, and particularly in the territory west of the Missouri River, for the past two or three years have given farmers money enough to fence land that hitherto lay open. A consequence of this is an exceptionally heavy demand for Barbed Wire, with an indication that Wire mills will have all they can do to fill their orders before long. We quote as follows: Painted Barbed Wire, $2.35 per 100 pounds, f.o.b. cars, Chicago, to jobbers; Galvanized, 30 cents higher. Prices to retailers 5 cents per 100 pounds higher than to jobbers in car lots and 15 cents in less than car lots; Staples, $2.20, Chicago, for Plain, and $2.60 for Galvanized to jobbers, with 5 cents advance to retailers.

Pittsburgh.—The demand is quite active, and the leading mills are running full and entering a good deal of tonnage. Prices are firm, and it is the expectation in the trade that another advance may be made early in February. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Smooth Fence Wire.—The requirements are large, and business is consequently being received by the mills in large volume. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90
Less than carloads	2.00

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12 & 12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—On the base sizes, 6 to 9, the current price is $1.95 per 100 pounds in car lots to jobbers, f.o.b. Chicago; $2 per 100 pounds to retailers in car lots, and $2.05 in less than car lots. A heavy tonnage is being booked at these prices.

Pittsburgh.—The volume of business is heavy, the mills having booked some large orders, and new ones are coming in at a heavy rate. Spring trade this year promises to be very heavy. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days. Plain Wire, $1.80, base, for Nos. 6 to 9, in carloads to jobbers, and $1.90 to $1.95 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Carriage Bolts, Machine Bolts, &c.—A meeting of the manufacturers of Carriage Bolts, Machine Bolts, Coach Screws, &c., was held January 20, and as the result of their conference the revised prices given below were adopted. Notwithstanding the somewhat unsatisfactory tendency of the market of late, the manufacturers report an increased volume of business and refer to the situation as promising, the indications pointing to a good trade and

at better prices than have prevailed for the past few months. The following discounts were adopted as representing the prices recommended for the trade in general, there being about the usual extras to the large buyers. Terms, 60 days, or 2 per cent. discount for cash in 10 days from date of invoice:

Common Carriage Bolts, ⅝ x 6 and smaller and shorter .....75 and 10
Common Carriage Bolts, longer and larger than ⅝ x 6 .....75 and 5
Machine Bolts, ⅜ x 4 and smaller and shorter..75 and 15
Machine Bolts, longer and larger than ⅜ x 4....75 and 10
Machine Bolts with C. T. and R. nuts.....70 and 10
Bolt Ends .....75 and 10
G. P. Coach Screws.....80
Cone Point Lag Screws.....80 and 5
Skein Screws 80

Hatchets and Adzes.—The manufacturers of Hatchets and Adzes have for some time been in conference, with a view to getting together in a strong organization, and the matter is regarded as practically, though not at this writing technically, consummated, in a combination which includes the leading makers of these goods. The arrangement is similar in its main features to that under which the Shovel pool was conducted for so many years, there being classified lists and prices graded accordingly. The list on Hatchets is substantially that which has been in general use for some time, but as printed below it will be observed that a uniform list is to be used in connection with the full polished goods, on which there has heretofore been some diversity. The discount on first-quality goods to the trade generally is 40 per cent., the list being as follows:

PRICE-LIST OF HATCHETS.

Shingling.

No.	Bronzed. Per dozen.	Full polished. Per dozen.
0	$7.50	$10.00
1	8.00	10.50
2	8.50	11.00
3	9.00	11.50
4	9.50	12.00
Half.		
1	$8.50	$11.00
2	9.00	11.50
3	9.50	12.00
4	10.00	12.50
Claw.		
1	$9.00	$11.50
2	9.50	12.00
3	10.00	12.50
4	10.50	13.00
Lathing.		
0	$7.50	$10.00
1	8.00	10.50
2	8.50	11.00
3	9.00	11.50
Barreling.		
0	$7.50	$10.00
1	8.00	10.50
2	8.50	11.00
3	9.00	11.50
Broad Hatchets.		
1	$10.50	$13.50
2	11.50	14.50
3	13.00	17.00
4	14.50	18.50
5	16.50	20.50
6	18.00	22.00
7	19.50	24.50
8	22.00	27.00
New England Pattern Broad Hatchets.		
0	$10.50	$13.50
1	11.50	14.50
2	13.00	17.00
3	14.50	18.50
4	15.50	20.50
5	19.50	23.00
6	22.00	26.00
7	23.50	27.00
8	25.00	28.50

Adzes are to be sold at the following net prices:

Net Prices for Adzes.

	Per dozen.
Carpenter, Half or Full Head, 3-4½ cut	$10.50
R. R., Half or Full Head, 5-6	11.10
R. R., Soft Head, 5-6	10.85
Ship Carpenter, Plain	13.20
Ship Carpenter, Lipped	16.00

Wagon and Carriage Springs.—The manufacturers in this line of goods report a fair though not especially heavy demand. The market, however, is somewhat unsettled, with more or less unevenness in quotations.

Steel Traps.—An advance in the price of Steel Game Traps has recently been made, and the market is referred to as in excellent condition.

The Wire Goods Company.—The Wire Goods Company, Worcester, Mass., have issued their discount sheet No. 21, applying to their catalogue of last January. In connection with revision of their quotations they sent out additional pages for their catalogue, illustrating new goods. These include Wire Drive Hooks, Tumbler and Tooth Brush Holder, Electric Lamp Guard, Ideal Towel Rack and Garment Hangers.

Mallory Mfg. Company.—Mallory Mfg. Company, Flemington, N. J., have issued a new list of prices and discounts on their Shutter Workers. The prices thus given are not materially different from those in force, but the list is more complete than any that have preceded it. Discounts on quantities are announced, those on less than 25 sets being as follows:

	Discount.
Polished Gold, Satin Silver, Oxidized Silver, Bronze	30 %
Bower Barff, Antique Brass, Oxidized Brass, Oxidized Copper, Dull or Old Brass, Bright Brass	25 %
Nickel	25 %
Japanned	20 %

Nuts.—At a meeting held January 19, the manufacturers of Nuts reaffirmed the prices adopted two or three months ago as follows:

	Off List.
Hot Pressed Square Nuts, blank or tapped	$6.00
Hot Pressed Hexagon Nuts, blank or tapped	6.50
Cold Punched Plain Blank Square Nuts	5.10
Cold Punched Plain Blank Hexagon Nuts	5.60
C. T. and R. Blank Square Nuts	5.30
C. T. and R. Blank Hexagon Nuts	6.00
Cold Punched Plain Tapped Square Nuts	5.10
Cold Punched Plain Tapped Hexagon Nuts	5.60
C. T. and R. Tapped Square Nuts	5.30
C. T. and R. Tapped Hexagon Nuts	6.00

The manufacturers agreed in reporting an improved feeling among the trade, and referred to the outlook for business as good.

Cordage.—As usual at this season of the year, trade is quiet, and manufacturers are accumulating stocks. The quotation of 8 cents per pound for Mixed Sisal Rope is more frequently made than heretofore. Quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 11½ cents; second-grade Manila, ½ to 1 cent per pound lower; Pure Sisal, 9¼ cents; Mixed Sisal, 8 cents per pound. These quotations are subject to a rebate of ¼ cent per pound to carload buyers.

Glass.—A number of the factories are being operated at scales of wages which are less than that established by the Window Glass Workmen's Association. This difference of wage scales makes it impossible for manufacturers to tell exactly what their neighbor's Glass is costing, and has resulted in considerable shopping around for prices by buyers. Some factories are shutting down, while others are closing down temporarily, on account of the unprofitableness of making Glass at the prices ruling. It is estimated that only about 25 per cent. as much productive capacity is now in operation as at this time last year. The fire will probably be of shorter duration than that of last year. These conditions lead some in the trade to believe that by June Glass will be extremely scarce. Manufacturers are not quoting as low prices as they were a week or more ago. Present quotations are reported as being 90 to 90 and 2½ per cent. discount from the manufacturers' list of January 1, 1901, for carload lots. In exceptional cases, for desirable orders, 90 and 5 per cent. discount might be obtained. Locally there is no established price, each jobber gauging his price in accordance with his estimate of what his customer will pay. This policy is not likely to continue for any length of time, as the jobbers will probably come to an agreement regarding prices.

Paints and Colors.—*Leads.*—The recent advances in Pig Lead and Linseed Oil prices caused the trade to expect the announcement of an advance last week in the price of White Lead in Oil. No advance was made, however. The possibility of an advance stimulated demand, and the higher cost of raw materials has had a steadying effect on the market, particularly on the less well-known brands. Quotations are as follows: In lots of 500 pounds or over, 6½ cents per pound; in lots of less than 500 pounds, 7 cents per pound.

Oils.—*Linseed Oil.*—Owing to the rapid advance in flax seed, the price of City Oil has been advanced 3

cents per gallon. It is reported that a large quantity of Oil was purchased, upon the possibility of an advance, for delivery up to April 1. Since the advance took place there has been but little increase in demand. The advance in seed is regarded as fictitious by some, as the result of manipulation of the market. The fact is recalled that large buyers of Oil on the last two or three fictitious advances have lost on such purchases, and it is surmised that they are not anxious to repeat their experiences. Quotations are as follows: City Raw, in lots of five barrels or more, 40 cents; in lots of less than five barrels, 41 cents per gallon. Out of town and Western Oil, 39 to 40 cents per gallon.

Spirits Turpentine.—During the week the market at Savannah has shown some weakness by the inability to sustain prices, as consumers have been buying only for immediate requirements since the recent high prices have ruled. Demand at this point has been light, at the following quotations, according to quantity: Oil barrels, 67½ to 68 cents; machine made barrels, 68 to 68½ cents per gallon.

Hardware Organizations.

Pennsylvania Retail Hardware Dealers' Association.

J. E. Digby, secretary of the Pennsylvania Retail Hardware Dealers' Association, McKees Rocks, Pa., has issued the following circular letter under the head of "A Chance to Combine Business, Profit and Pleasure:"

The third annual meeting of the Pennsylvania Retail Hardware Dealers' Association will be held at the Park Hotel, Williamsport, Pa., Feb. 16 and 17, 1904. The association is growing in membership rapidly, having added about 50 names during 1903. Permit us to cite a few reasons why Hardware merchants should be affiliated with it.

The Pennsylvania Association should be at the head of the column in the movement. Other and younger States of the Union have organized several years before we have, consequently have large and strong organizations. We have every reason to believe that the meeting will be well attended and an enthusiastic success. Can you afford to miss it? We need all the good members we can get.

The great majority of the manufacturers and jobbers of Hardware recognize the retail Hardware dealer as the legitimate channel through which to reach the consumer, and are loyal to them. A few, however, do not seem to use methods satisfactory to all retail dealers. Organization will better these conditions. You need the association possibly more than you know.

The catalogue and mail order house competition is a new born pest, and would never have been born but for the apathy and want of organization among the retail Hardware dealers of the United States. If there was no other reason for all live dealers to belong to the organization, this reason alone should suffice, for at the next session of Congress an effort will again be made to pass a Parcels Post bill, which would put many, very many, merchants out of business. The bill is drafted, the lobby at Washington are planning to influence legislation.

Are trading stamps a pest with you? Organization will teach you how to get rid of them.

Mutual fire insurance will save you money. In fact, you will realize more benefit, more actual profit, more *bona fide* dividends out of a day or two spent among your fellow toilers in the Hardware trade than you can possibly realize to stay at home.

You cannot afford to miss this meeting, the times and conditions demand your attention to a matter that concerns every retail Hardware dealer in the State.

We trust you have so arranged your affairs to be with us at Williamsport, February 16 and 17, 1904.

It is to be hoped that those merchants in the State not yet affiliated with the association will give the matter of membership in it serious consideration. The association already comprises a number of the largest and most enterprising houses in the State, but to make the work more effective and the association more influential a larger percentage of the dealers in the State should be enrolled in the membership. During the past year the officers have made energetic efforts to put the association on a substantial basis, and as their good work is intended to benefit not only the members, but all the merchants of the State, it is to be hoped that a goodly proportion of those now outside the organization will lend a helping hand.

St. John Iron and Hardware Association.

The tenth annual dinner of the St. John Iron and Hardware Association was held at the Union Club, St. John, N. B., on the 20th inst. The toasts were as follows: "The King," proposed by the chairman, A. M. Rowan; "Our Association," proposed by the chairman and responded to by W. S. Fisher; "The City of St. John," proposed by the vice-chairman, John Keeffe, and responded to by the Mayor, Deputy Mayor McGoldrick, Alderman Robinson and D. J. McLaughlin, president of the Board of Trade; "The Iron and Hardware Manufacturers," proposed by W. H. Thorne, and responded to by J. A. McAvity, Charles McDonald and John Keeffe; "Our Guests," proposed by M. E. Agar, and "The Ladies," proposed by W. S. Fisher, brought forth responses from a large number present. The officers of the association are: President, A. M. Rowan; vice-president, John Keeffe; secretary-treasurer, John J. Barry; directors, W. H. Thorne, Thomas McAvity, R. B. Emerson. The Dinner Committee comprised A. M. Rowan, John J. Barry, J. A. McAvity and J. P. McIntyre.

Chicago Retail Hardware Association.

The Chicago Retail Hardware Association held their 11th annual ball and reception at the Illinois Hall, Ogden avenue and Madison street, Wednesday evening, January 20. In spite of the extremely inclement night a large number of the members, with their wives and friends, attended and were rewarded by an unusually enjoyable time.

Iowa Retail Hardware Dealers' Association.

The programme for the annual meeting of the Iowa Retail Hardware Dealers' Association in Des Moines, February 10, 11 and 12, headquarters at the Kirkwood Hotel, has just been issued. An inspection of it warrants the anticipation of a very interesting and instructive meeting, the papers and addresses being all of a very practical nature. On the morning of the 10th meetings of the executive committee of the association and of the directors of the insurance company will be held. In the afternoon the first session will be called to order at 2 o'clock. During the convention the following papers will be read: "Credits," Frank R. Currie, Mason City; "Why Field Fencing Should Be Handled by Hardware Dealers," by L. A. Gnam, Carroll; "Stoves—Shall We Let This Department of Our Business Go Into the Hands of the Instalment Houses?" by Walter C. Baumgartner, Dubuque; "Paints—Why This Business Belongs to the Hardware Dealer," by G. L. Miles, Grinnell; "How to Make the Field and Garden Seed Department of Your Business Profitable," by C. E. Haas, Le Mars; "Can Furnaces Be Successfully Handled In a Hardware Store," by J. F. Doty, West Liberty; "Hardware and Harness," by J. D. James, Storm Lake; "Hay Tools In a Hardware Store," by F. W. Woodruff, Correctionville. Addresses will also be made by M. L. Corey, secretary-treasurer of the National Retail Hardware Dealers' Association, and by A. T. Stebbins, Rochester, Minn., director of Minnesota Retail Hardware Dealers' Fire Insurance Company. On Thursday evening, 11th inst., a banquet will be tendered the delegates by the Des Moines Hardware and Implement Manufacturers and Jobbers, at which Governor Cummins is expected to be present and make an address.

Colorado Retail Hardware Dealers' Association.

Under date of the 20th inst., F. C. Moys, Boulder, secretary-treasurer of the Colorado Retail Hardware Dealers' Association, issues the following circular letter relative to the next annual meeting of the association at Denver, on February 15 and 16:

You have probably finished taking stock by this time, and I trust the result as shown is satisfactory.

Now, let's consider the Hardware Dealers' Association. We are not quite a year old and yet we feel that

our association has accomplished a little already for the general betterment of the Colorado Hardware dealers.

Our annual meeting occurs at the Windsor Hotel, Denver, February 15-16, and it is essential that every retail Hardware dealer in the State (whether a member or not) be present. The general plan of the meeting will be about as follows:

Monday, February 15, 9.30 a.m.—Opening Meeting; Appointment of Committees, &c. 2 p.m.—Executive Session; Report of President; Report of Secretary-Treasurer; Report of Grievance Committee; General Discussion.

Tuesday, February 16, 10 a.m.—Executive Session; Reports of various committees; Addresses. 2 p.m.—Election of Officers; Completion of Official Business.

The Denver merchants have prepared a royal good time for all visiting Hardware dealers and their families, which will be as follows:

Monday, 10.30 a.m.—Car ride about the city. Evening—Smoker for men only. This will be a select affair, and none will be admitted but Hardwaremen and their friends. Invitations will be distributed Monday afternoon.

Tuesday, 1.30 p.m.—The ladies and children will meet in the lobby of the Windsor Hotel and from there be conducted to the Orpheum Theatre. Evening—Banquet at the Windsor Hotel.

The Denver marchants especially invite the Hardware dealers to bring their families, and you will notice they have arranged plenty of entertainment for all.

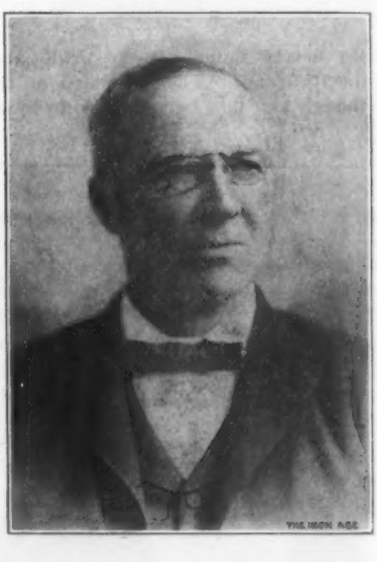
It is important that we know as soon as possible about how many will attend, how many will bring ladies or children, and whether or not the children will be of suitable age to attend the banquet. Please send me this information at once on inclosed card. If you are uncertain, state what you think you will do, but answer in some way.

A special rate of $2 a day, American plan, and including the best rooms in the house, has been secured at the Windsor Hotel.

Don't fail to be on hand. Kindly let me hear from you at once.

Philadelphia Hardware Merchants' and Manufacturers' Association.

THE eighteenth annual dinner of the Hardware Merchants' and Manufacturers' Association of Philadelphia was held on Tuesday evening, 26th inst., at the Hotel Bellevue. About 140 members and guests of the association participated. Previous to the dinner an informal reception was held in the parlors of the hotel. The guests proceeded to the banquet hall, music being furnished by a hidden orchestra. The banquet hall was decorated with greens and flags, the tables being adorned with a plentiful supply of Hardware novelties, furnished by the manufacturers, which were later distributed as souvenirs. Carnations predominated in the floral dec-



THOS. DEVLIN. Newly Elected President.

orations. Rev. John R. Davies, D.D., invoked the blessing. T. James Fernley acted as toastmaster in his usual happy manner. William C. Peters, retiring president, was absent, owing to ill health, and sent a letter of regret. Mr. Fernley accordingly introduced the newly elected president, Thos. Devlin, who responded briefly, thanking the members for the honor conferred and promising his best endeavors during his term of office. A vote of thanks was extended to the manufacturers providing souvenirs. A list of deceased members of the association, from its beginning, was read, the guests standing during the recital.

Mayor Weaver being introduced, said that Philadelphia was very proud of her manufacturers and merchants, and he was constantly reminded in his daily work of the importance of Hardware. He doubted whether there was a civilized country in which the names of the Disston Saw and the Black Diamond and McCaffrey Files and many other of the representative lines manufactured in Philadelphia were not known. He was proud that Philadelphia was the home of these manufacturers and hoped that nothing would ever happen to make them leave the confines of the city limits. He said he aimed to enlarge the sphere of the city's manufactures and extend greater facilities for their growth in every direction. It was the intention of the present administration to do nothing to curtail the advance and advantages enjoyed by the manufacturers of Philadelphia, and closed by wishing success to all.

H. P. Lupton, vice-president of the Oliver Iron & Steel Company, Pittsburgh, responded to the toast, "Our Manufacturers." He said that the Philadelphia brand was the stamp of excellence in the manufacture of Hardware. Her manufacturers left no stone unturned to place their goods in the markets of the world. Her manufacturers may well feel proud of the distinction they have earned. The lot of the manufacturer, however, was unenviable. Raw material must be purchased, manufactured, labor contended with, and all without knowledge of what the selling price would be. The merchant had none of these worries, having simply the selling price to make and to gather in the profits.

Daniel Stern, editor of the *American Artisan*, followed Mr. Lupton, discussing in a brief address "Hardware from an Editor's Standpoint."

IS PHILADELPHIA SLOW?

was the subject of the next toast, responded to by J. S. Bonbright of the Supplee Hardware Company. Mr. Bonbright's address was as follows:

Were we to leave the subject in this interrogative form, doubtless many would be willing to accept the well nigh universal opinion, following the music hall jest, or oft repeated statement of the tourist, who, accustomed to spending his Sunday in less orderly places, resents the quiet and order of our city, resulting from our better enforced laws. Others, who would deplore a continental Sunday in their own residence town, are willing to take an occasional dip into its gaieties and wide openness, and being deprived of their expected dissipations here, spread the report abroad that Philadelphia is slow.

No doubt to one so unfortunate as to be compelled to "Sunday" in a hotel the time moves slowly, and the closed playhouses and *cafés* seem an evidence of our being behind the times. Perhaps her people, by their apparent lack of interest in what others think of their city, have fostered this idea, for we must confess to this—that, unlike most towns, we notoriously fail to blow our own horn. But to Philadelphians the city's greatness is so self evident, her substantial and enduring importance so beyond compare, that it seems a waste of time to discuss the subject with the man who questions it. Their attitude is one of amused toleration for one so lacking in judgment, or contempt for one who estimates a city's

greatness by the opportunities for entertainment. To such opinion we can offer no argument, but turn to speak of those fundamental elements of civic greatness that are so clearly in evidence to the intelligent seeker.

In these days of mushroom growth, both civic and industrial, it is a source of great satisfaction and pride to be able to refer to a glorious history, and to trace the present development back through the century to the days when our nation was in its formative state.

AN AMERICAN CITY.

Philadelphia has always been pre-eminently an American city, containing to-day the smallest percentage of foreign born among all the great cities, and no opportunity has been neglected by her people to respond to

JOHN R. GRIFFITH, Newly Elected Vice-President.

the needs of the country as a whole, or to any section of it, as far back as, and before, the days when less than 100 of our merchants subscribed $1,500,000 to help the father of his country feed his starving Continental army, to the quick response of our Permanent Relief Committee to get the first supplies into stricken Galveston. The committee has collected, in a couple of decades, more than $5,000,000 worth of supplies and money for those of this and other lands, in seasons of dire extremity. The mention of a few may not be out of place.

This committee was organized in response to a call from Germany in 1878, for the relief of those suffering from the results of freshets. The citizens of Philadelphia met at the Mayor's office and formed a committee to solicit subscriptions, and to our city's credit, be it said, more was contributed than was subscribed in Berlin. It has been in permanent activity ever since.

Among the calamities which have occurred none is more prominent than the Johnstown disaster. It collected at that time about $800,000. Next in importance was the Russian famine in 1891 and 1892, when Philadelphia contributed more toward the relief of the famine stricken peasants than all the rest of the United States together. Other disasters which come to mind at the present time are the earthquake at Charleston; yellow fever at New Orleans; yellow fever at Memphis, a year or two later; Oil City, Titusville; typhus fever epidemic at Plymouth; Armenian Relief Fund to help the Armenian Christians; relief extended to Porto Rico and other places after the Spanish-American War; floods in California two years ago; flood disaster in Kansas last year; the latest relief was for the typhus fever stricken people in Butler, Pa. Here it had its own hospital, called "The City of Brotherly Love Hospital." It sent 25 trained nurses and a number of physicians.

When necessary, Philadelphia has been as quick to fight as to feed, and no community has offered a larger quota to the defense of our liberties.

If the visitor fails to note upon our streets the crowds seen in other cities, let him remember that our citizens have homes, not tenements, to live in; that over 4000 acres of pleasure grounds, scattered in 40 parks over our broad domain, afford a restful and rational means of enjoyment, much preferred to the crowded streets.

Perhaps we are slow to adopt some of the modern improvements of other burgs. Apartment and tenement houses fail to appeal to a city that continues to build 8000 or 10,000 dwellings yearly, and contains to-day more houses than our neighbor with three times the population.

A CONTRAST.

The number of homes in Philadelphia containing more than ten persons is but 12¾ per cent. In New York the proportion of families having more than ten persons in a dwelling is 83½ per cent. Only 15 per cent. of the houses in Philadelphia contain more than one family. In New York 88 per cent. are so occupied, and in Chicago 65 per cent. of the houses have two or more families.

The average size of the Philadelphia family is 5.10, which exceeds that of the general average of the entire country over 3 per cent., and is greater than that of any other large city; that of New York being 4.84, of Brooklyn 4.93, of Baltimore 5.01, St. Louis, 4.92, and Chicago, 4.99. This is obviously due to the fact of higher sanitary conditions, and an orderly mode of life due to the general ownership of homes by occupants.

INDUSTRIALLY

we continue to advance, building more locomotives than all the country combined, supplying the navy with half or more of its best ships, making more carpets, making better hats and shoes, Saws, Files, Edge Tools, Household Utensils, &c.; sustaining our reputation for both quality and quantity, and being most careful that our products shall excel all others, until merchants everywhere acknowledge that "Philadelphia made goods are good goods."

Time is lacking for even mention of our pre-eminence in many of the arts and sciences since the days when Franklin had to come to Philadelphia to find the lightning.

Here also is the home of our pride and pet, the Pennsylvania Railroad, "The Standard of the World." Yes, even though she has hurt our pride by refusing to

J. S. BONBRIGHT.

bring some of us down town, that she may better accommodate the multitude of buyers and tourists, for whom she has been compelled, at the cost of millions, to provide several terminals.

So, while we may be called slow, we are surely not slothful, or the world would not come here for her models, as note the fact that this association has been the pattern for others all over the country, and our National Hardware Association, acknowledged at home and abroad as the leading and model trade organization, which owes so much of its success to the formative years when it was managed by Philadelphians, and, indeed, still con-

tinues to exist, despite the lack of any disposition to retire or rotate on the part of at least one of its greatest officials.

So here's to the good, slow Quaker City, which, like a great, good natured giant, is steadily pushing forward, careless in the consciousness of his strength, and unmindful of the jests and jibes of little minds, pursuing the even tenor of his way "with malice toward none, with charity for all."

THE BUYER.

"The Buyer" was the next toast, Charles Z. Tryon making the response. Mr. Tryon's address was as follows:

I wonder if in any scientific institution the learned doctors have ever dissected the remains of one of our

T. JAMES FERNLEY, Secretary-Treasurer.

modern buyers? I do not mean the department store buyer who buys for 57 departments and really knows only three right down to the ground, nor do I refer to the syndicate buyer who does not have to sell the goods he purchases, but I have in mind that mysterious creature we find in every large jobbing house, who sits, sphinx-like, behind a great desk, with hundreds of pigeon holes stuffed full of quotations; and buried beneath a great pile of catalogues from all over the world.

THIS HUMAN ENCYCLOPEDIA

who knows the cost, jobbing and retail price of every article he buys; its true value in actual use and how to use it. I wonder if this post-mortem would not reveal the buyer's brain to be full of Tacks and Saws, Hammers, Guns and Fish Hooks? Many will say at once that his heart would be found missing, and ice water slowly coursing through his veins. But there is no use in guessing about his insides; surely his outside aspect is interesting enough.

I suppose he looks different to every man with whom he comes in contact. To the head of the house he is that highly expensive individual who keeps the bank balance continually on the ebb tide, who always has the warehouses full to bursting in dull season, and no goods on the shelves when things are booming. He is that troublesome person who induces the respected senior to sign contracts on faith, from which agreements it requires six Philadelphia lawyers to extricate the house.

To the traveling force he is the one man who should be fired six days a week, because his competitive buyer in the rival house always—not once or twice, but always—has goods bought on a better basis. I fancy there is not one man on the road who could not buy goods better than this oracle who speaks to him principally through the medium of carbon copy instructions. Then, too, he always insists that the salesmen shall sell stuff and brands that their customers do *not* want. Why don't he buy the X. Y. Z. goods that Brown & Co. sell? As viewed by his stenographer, he is the kind and pleasant, sour and disagreeable man who talks to silly drummers all day and dictates his mail at 5.45 p.m.

In the eyes of the office boy he is the godlike person who don't look up when a card is presented, who calls him into his office a dozen times a day and then says, "Well! what do you want?" To this little chap he is a personality to be feared and admired. Judged by the drummers who sell or do not sell him, he is at once a gentleman and a scholar, a boor and an ignoramus, an able man or a presumptuous upstart, just as the case may be. And to his good wife he is the hard worked, underpaid, worn out person who leaves home before daylight and returns in the evening too late to go to the theater; the highly prosperous man who cannot afford to get her a muff, while Mr. Jones, who buys for a much smaller house, presented *his* wife with a whole set of furs for Christmas.

THE "LEADING LADY."

Whatever he is *not*, the buyer certainly *is* the heavy man in this theatrical troupe. The traveling man may impersonate the advance agent, the senior of the firm may represent the manager, the cashier the box office man, and the sundry clerks may chime in well as the chorus and understudies, but certainly, in this show, the buyer is the "Leading Lady."

Act? Why Booth or Jefferson never undertook such a task as one day's work of the modern buyer. Think of sitting all day long scheming and scheming, with interruptions every ten minutes from the line of drummers waiting for an audience; looking pleasant at this one you hate, because he has the goods you want, and scowling at the fellow you like because his house won't allow something. The buyer must be sad when he's merry, merry when he's sad, violent when he's meek, gentle when he wants to smash things; pleading poverty when he's trying to get dating, and swelling up with the conscious pride of a millionaire when he is striking for a larger

C. Z. TRYON.

cash discount. If he could see these fellows all at once—but no, each one may have something of value to tell him, and so he must see them all, and one at a time.

He is very like a parrot I once knew of, the property of the box office man in Adam Forepaugh's show. Her favorite perch was by her master's elbow during the great rush to buy tickets at each performance, and she had learned to imitate perfectly the oft repeated words of the ticket man—"One at a time, gentlemen; one at a time, please. Don't crush." Well, one day in a country town Polly was missing, and in great anxiety her master scoured the country searching vainly for his lost pet. While passing a corn field a familiar voice caught his ear. Jumping the fence and entering the field he discovered poor little polly lying upon her side, and terror darting from her eyes, completely surrounded by a flock of crows

who had pecked every green feather from her poor little body, and there she lay yelling at the top of her lungs, "One at a time, gentlemen; one at a time, please. Don't crush."

And when these drummers are gone has the buyer a moment's rest? Oh no, for then there is the same game to be played by correspondence, the bluffing of factories, the bulldozing of railroads and the jacking up of salesmen. Tragedy and comedy, comedy and tragedy, all in the same hour and every hour.

Of course, the firm are very kind to the buyer; they give him lots of assistance—stenographers, index systems, order blanks and a hundred devices for saving time and for keeping records, but the most of his information must be kept in his poor, aching head, for half the time his clerks are away and his elaborate card systems are always suffering from nervous prostration. Some wit has recently described this situation in verse better than I could tell you, or even the buyer himself:

Oh, isn't it great to be "up to date"
And live in this year of grace,
With a system and place for everything,
Though nobody knows the place.

We've an index card for each thing we do
And everything under the sun;
It takes so long to fill out the cards,
We never get anything done.

We've loose-leaf ledgers for saving time,
The Lord knows what they cost,
When half our time is spent each day
Hunting for leaves that are lost.

Stenographers who spell like h——
And make us swear and cuss,
When we are not dictating to them,
Why, they are dictating to us.

And sectional this and sectional that,
(We'll soon have sectional legs);
I dreamt last night that I made a meal
Of sectional ham and eggs.

I dreamt I lived in a sectional house
And rode a sectional "hoss,"
And drew my pay in sections from
A sectional "section boss."

Oh, isn't it great to be up to date,
And live in this year of grace,
With a system and place for everything,
Though nobody knows the place.

At last the busy week is ended and out of this chaos and confusion the buyer emerges on the bright Sabbath morning, for once himself. He settles himself comfortably in the corner of his pew and, as he congratulates himself that the lot of Sausage Stuffers he has just bought is the cheapest bargain on earth, he is abruptly shocked by the awful words of the clergyman, proclaiming that "Salvation is the cheapest thing in the world; we are giving it away right here for the asking"; let us all sing heartily that beautiful hymn, "Work for the Night is Coming."

And thus the buyer appears to live and work, but if we really knew his inner life what a different being we should find. I very well remember in my early youth calling upon a house which I had been selling, and was informed that Mr. J. was now buying my goods instead of Mr. S. Entering Mr. J.'s office, I said, "Good morning, I have been fortunate enough to sell your predecessor quite a number of goods in the past and I do hope that I shall be able to interest you." He darted one glance at me and then yelled: "Predecessor! I have been the buyer of this house for 20 years; that man you have been selling was my assistant, whom I fired last week, and the goods you sold him last year are still on my shelves. Do you want to take them back?"

A LITTLE CODE OF RULES.

Fortunately I had followed one of the first rules of the amateur salesman, and I had remained standing with my hand upon the door knob, so that I was able to beat an orderly retreat without leaving any of my baggage on the field. Subsequently, however, I succeeded in selling this man and learned to know him as a friend; a man of genial and happy disposition—he was simply a good actor. My close adherence on that first day to a little list of rules had saved me. This little code was as follows, and may be of value to some budding salesman here present:

1. Leave the door open or stand with your hand on the knob until the buyer speaks.
2. If after coughing once, mentioning his name twice and your own three times, he does not look up, he's busy, call again.
3. If he stretches out his legs, thrusts both hands into his trousers pockets and looks up at you, showing the whites of his eyes, look out for a claim.
4. If he greets you cheerily, asks you to sit down, and leans confidentially across his desk to converse with you, he has already bought and is working you for price.
5. If you notice him clutching a paper weight, depart at once—sooner, if possible.
6. But if he quickly glances at you with a hurried hello and again buries his face in his papers, draw your chair up confidently—he has an order for you.

Holmes has said: "The human race is divided into two classes; those who go ahead and do something and those who sit and inquire." Now, the poet had evidently not met a modern buyer, for he must at once be a man of action and at the same time be a regular cross questioning attorney.

A NORMAL MAN.

So, view him as we may, the buyer must be, all in all, a normal man—a truly testy and ungenerous nature is an ill-assorted companion of the calm judgment required to buy right. The requirements are great; the buyer is the secretary of state to every house, and he must be well skilled in the art of diplomacy, which is but a grand word for tact. The selling end of the business may do its part, but it is a fact that goods bought right are already half sold. Stock must be on hand, too, when wanted, and not in excess of demands, or conflict arises at once with those in the office who figure interest and insurance. To properly adjust these conditions the faithful buyer must possess an insight into the future almost prophetic. He must know every wave in trade conditions, note every change of taste in styles with the practiced eye of a consumer, and know intuitively what will sell and how many. Nor devoid of all sense of the artistic may he be, for surely the package and the label are well within the province of the buyer, and every one knows what a trusty, though silent, salesman the package is.

It certainly is a wise policy that many houses have adopted, of permitting or insisting upon each buyer taking one short, annual trip. The buyer sits in his office, surrounded by books and papers, facts and figures, and fights at long range the battle of selling goods. One trip a year will largely brush the dust from his glasses and fit him better for his work than any other one thing that he can do. With what force do his arguments play upon a balky factory if he can say, "I saw it with my own eyes."

BUSINESS MEN SHOULD GIVE THEIR BUYERS

the broadest education possible, for do they not hold in the hollow of their hands the welfare of the concern they represent? Not only in a commercial sense, but in a broader, moral sense the buyer is a prime factor, for the attitude of the buyer largely determines the impression which the house makes upon the commercial world; if he be unjust or tricky, so seems the house; be he frank, just and truthful, the house will bear this reputation.

And so I believe that the twentieth century buyer has a personality of his own; that he *has* a heart and many genial qualities which, as we have seen, he dare not always show to the world; and with these thoughts in mind my toast to-night would be, "To the Jobbers' Buyer." God bless him! he needs the support and the good will of every man in the house.

DR. DAVIES' ADDRESS.

Rev. John R. Davies, D.D., pastor of the Bethlehem Presbyterian Church, then addressed the gathering.

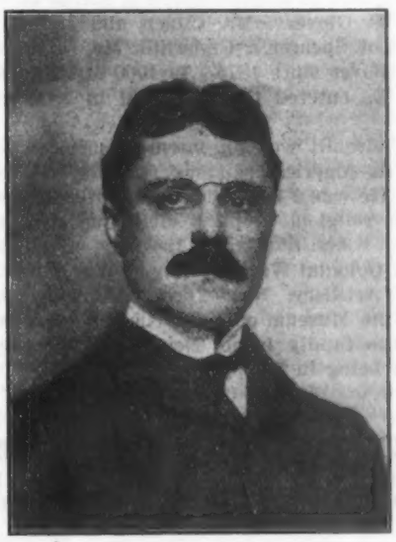
Dr. Davies said it was an honor to be again a guest of the association. He commented on the serious vein of last year's address, and the propriety of again making a speech of that nature. He told a number of interesting stories, and referred to the wonderful era through

which we were passing. Some wonderful dispensation, he said, had brought about the present conditions. There were so many vast discoveries and the bringing together of such gigantic forces—radium and its possibilities, electricity and its accomplishments. We were on the threshold of the most wonderful era the world had ever seen. Large doors of opportunity were opening on every side. God, he said, had prepared these opportunities for us, and it was for us to grasp and benefit by them. Japan and Russia tarry in their impending struggle. Great powers stand aside, indicating that human life means more than it did centuries ago. Life is ever in need of more comforts, luxuries and necessities, thus giving opportunity for manufacturers to extend their wares. We are all part of a great system, and we must remember that God is in this work and our business is with God. We are parts of a divine system directing and shaping things, not always in our views, but in the views of One greater than we are.

THE COMING GENERATION.

Chas. W. Asbury of the Enterprise Mfg. Company then made an address on "The Coming Generation," as follows:

The inferred question which has been assigned me is not a new one; it has been discussed during all ages, and probably will be discussed in the ages to come. If a direct answer be asked, I should reply: Yes, the



C. W. ASBURY.

chances of success to a young man are as brilliant to-day as ever, and especially is this so in our own country.

TO ACHIEVE SUCCESS.

the young man must be born of the determination to climb the ladder at whatever cost, and to assume the incidental responsibilities, meet the inevitable difficulties, leap the obstacles which will no doubt be in his path. There are, unfortunately, but a small percentage of the young men of to-day who have sufficient self-control and indomitable energy to reach the goal. It is far easier to drift with the tide and enjoy the pleasures of life than to get a grip on one's self and prepare for a campaign of hill climbing; but if he has a sincere desire to leave the world better than he found it, it is necessary for every young man to regard his occupation as a jealous mistress. This applies with equal force to the professions as well as to the commercial and industrial affairs. Life is but an education, by which I do not mean book learning, but rather a knowledge of men, a knowledge of affairs, and particularly a knowledge of one's own business or calling. Persistence belongs in the cornerstone of the boy's structure. Get-rich-quick schemes are always looked upon with suspicion; therefore, when young we must look forward to a long period of close application before we see the results of our efforts. It is this prospect that discourages the larger number of young men entering the world's affairs. Unless they can look forward to this period with determination to succeed we see many of both extremes at the goal.

It has been asked, What is the reason for success or failure? It cannot be opportunity, because we see examples of notable successes among those to whom opportunity has been a stranger. In commerce and industry it cannot be book learning, because the large majority of the captains started life with very little education. It cannot be good clothes or good manners, as we see many of both extremes at the goal.

MY DIAGNOSIS

would be that it is inherent in the boy. If I were asked to advise upon the requisites, I should say he must enter his chosen path with zeal, pursue it with zest and energy, taking delight in the beginnings of success and using the experience thus gained in larger fields. This delight should not be primarily or mainly for the money returns so much as for the very glory of it. I would say keep the body and mind in the best possible condition for battle, and especially the mind, as success can only be attained through training. Be loyal and patriotic, be fair in all of your dealings, and generous in your thoughts, cultivate only those acquaintances with whom contact is profitable in knowledge. Accustom your mind to close application, directing it always in the chosen channel, at the end of which keep in view the desired goal. If the boy has an honest conviction and determination to make his mark, there is no power on earth which will stop him.

THE BEST FIELD.

If I were asked to name the best field for the accomplishment of these objects, I would say, broadly, the United States. If experience be taken as a guide, we have but to note recent history. Gentlemen, you all know, but do you thoroughly realize, the rapidity with which this country is growing. I am not going to burden you with statistics, but in my own line, manufacturing, it will be sufficient to say, that the figures taken from the United States census show that the value of manufactured goods in the past 50 years has almost geometrically doubled with the passing of each decade. In 1850 this value was shown to be $1,000,000,000, while in 1900 the value was $13,000,000,000. Our commercial position before the world has developed in almost the same ratio. The value of manufactured goods exported in 1840 was $11,000,000, while in 1902 it was $403,000,000, and in this connection it may be interesting to note that the increase in the value of our exports during the past 12 years was nearly double the total increase during the preceding 90 years. With such figures before us, can we ask for a better field in which to labor.

ETERNAL VIGILANCE THE PRICE.

It is not fair to assume that the momentum of this development will carry us on and on, provided only we have a sufficient number of progressive, aggressive and determined young men to whom we can look for assistance. I do not for one moment desire to discount the value of the older heads in directing affairs, but look if you will among the captains in the professions, in industry and commerce—do you not find many a gray-haired man surrounded by bright, capable, thinking young men who, themselves, are managing certain departments of the business? In such a field as I have named, and in such a time as the present, can it be questioned that a young man can achieve success if he has the necessary attributes. Success can be purchased, but the cost is high—eternal vigilance is the price.

Short addresses followed by R. L. Austin, E. A. Bolles, Edward Ingalls and Geo. A. Graham, after which the gathering broke up with the singing of "Auld Lang Syne."

OFFICERS FOR 1904.

At a meeting of the association, held on the 19th inst., the following officers were elected:

PRESIDENT, Thos. Devlin.

VICE-PRESIDENT, John R. Griffith.

SECRETARY-TREASURER, T. James Fernley.

DIRECTORS—Wm. W. Supplee, Samuel Disston, James H. Ritter, Wm. C. Peters, Ellicott Fisher, E. S. Jackson.

THOSE PRESENT.

At the guest table sat the following:

Chas. M. Biddle.	Thomas Devlin.
Hugh McCaffrey.	Rev. Jno. R. Davies, D.D.
A. Eugene Bolles.	Chas. B. Adamson.
James H. Ritter.	H. B. Lupton.
Daniel Stern.	John R. Griffith.
Samuel Disston.	C. W. Asbury.
Hon. John Weaver.	Milton Jackson.
T. James Fernley.	

At the other tables were seated the following:

Chas. E. Grange.	Geo. Koon.
Arthur L. Jennings.	Chas. M. Biddle, Jr.
J. Deleplaine Green.	E. Sayre Fogg.
Edw. Ingalls.	Henderson Gilbert.
Tom Almgill.	D. H. Reddie.
Leonard Lawrence.	Robert Biddle, II.
John McCausland.	W. K. Wilson.
Wm. M. McIntire.	Chas. M. Ghriskey, Jr.
Wm. R. Kendall.	George B. Darby.
Geo. Bande.	Louis J. McGrath.
Albert Butterworth.	T. Frank Devlin, M.D.
A. G. Gilfillan.	S. T. Reigner.
Louis Wilson.	Walter Devlin.
Nelson R. Perine.	Thos. A. Fernley.
Henry C. Ghriskey.	Frank G. Drew.
Edward Knight.	Francis S. Laws.
D. W. Dwight, M.D.	Chas. Z. Tryon.
Robert J. Maharg.	J. Shallenberger Bonbright.
Stephen E. Jennings.	P. Augustine Griffith.
F. Robert Hall.	N. F. Cressman.
Everett E. Boynton.	H. Vance Peters.
Jos. M. Hottel.	Job T. Pugh.
J. B. Morgan.	A. A. Miller.
H. C. Russell.	O. M. Milligan.
J. D. Brainerd.	F. Horton.
W. N. Sweet.	Wm. J. Devlin.
E. C. Griswold.	James T. Riley.
Robert D. Ghriskey.	Col. Geo. E. Mapes.
Geo. Holmes.	S. Horace Disston.
Ellicott Fisher.	Crawford Miller.
Wm. L. Coover.	Alfred C. Rex.
Chas. O. Krauss.	Wm. Miller.
W. Allen Barr.	E. F. Cooper.
John L. B. Holme.	F. Wiggins Huff.
A. C. Albrecht.	R. R. Canarroe.
C. Alexander Huff.	Wm. A. McCaffrey.
Clarence R. Brown.	Walter A. McCaffrey.
Elmer E. Brown, M.D.	Hugh I. McCaffrey.
Chas. L. Schlater.	Wm. Reed.
D. W. Wolf.	John H. Cannaroe.
Samuel E. Carver.	F. D. Mitchell.
Thomas Hobson.	E. S. Jackson.
John Allen.	Geo. A. Graham.
John L. Clayton.	Ralph H. North.
Jas. J. Gildea.	S. G. North.
S. F. Wilson.	Robert J. Johnson.
Wilber A. Bothwell.	Geo. L. Irvin.
Geo. E. Saul.	Harry C. Disston.
W. H. Stubbs.	Chas. Haselton.
Harry Mayer.	Wm. Bumm.
Henry W. Scattergood.	Tylee B. Hendrickson.
Alfred W. Barnett.	John E. Harbster.
Geo. F. Barnett.	H. H. Bronson.
Henry J. Gosling.	H. S. Hendrickson.
Chas. J. Pfeiffer.	Jos. J. McCaffrey.
David S. Cann.	Edward V. McCaffrey.
Robt. W. Mallon.	James Tinsman.
J. H. Van Newkirk.	A. E. Jackson.
C. D. Shoemaker.	Wm. B. Riley.

SOUVENIRS.

The following souvenirs were distributed at the banquet:

NATIONAL SPECIALTY COMPANY: Food and Meat Choppers.
MCCAFFREY FILE COMPANY: Manicure Files, Rasps, and Flies from 2½ to 20 inches.
ENTERPRISE MFG. COMPANY: Coffee Mills and Meat Choppers.
P. & F. CORBIN: Desk Atlas, bound in cloth.
MAYER & CO.: Manicure Files.
HENRY DISSTON & SONS: Saws, Squares and Screw Drivers.
MILLER LOCK COMPANY: Protector, Jr., Padlock.
I. M. ROSE COMPANY: Knife Grinder and Scissors Grinder.
G. & H. BARNETT COMPANY: Files of all kinds.
J. BARTON SMITH: Braces, &c.
FAYETTE R. PLUMB, INCORPORATED: Hammers.

ENTERTAINMENT.

During the evening the following specialists furnished entertainment: Miss Anna Elizabeth Kelly, contralto; Miss Helen Mae Wilson, reader; Paul Volkman, tenor; Frank Bain Ball, baritone; Master Frank Albertson, soprano; W. Lane Hoffner, accompanist.

J. G. Slater has sold his Hardware business in Correll, Minn., to R. R. George.

DEATH OF EDGAR UNDERHILL.

EDGAR UNDERHILL of Underhill, Clinch & Co., New York, died Saturday, January 23. Death came as a surprise to his many friends in the Hardware trade, for few knew of his illness. Mr. Underhill was born in Yonkers, N. Y., September 21, 1840, but moved to New York City when a child, and lived there continuously. He was a lineal descendant of Capt. John Underhill, who landed in Boston in 1630, and subsequently commanded the Dutch troops. John Underhill moved to Oyster Bay, Long Island, and settled on a farm, which is still in the Underhill family. Nathaniel, one of the sons of Captain John, settled in Westchester in the Bronx, and Edgar was a descendant of what is known as the Westchester branch. His father was David Hunt Underhill, and his mother Harriet Underhill. Edgar Underhill's family consisted of his wife, son, Frederic E., and daughter, Florence. His attachment to the family and home were marked traits, and in the Hardware Club, of which he was one of the early (1893) members, it was a daily scene for father and son to be dining together or with friends. Of a natural cheery and genial disposition, the strictest honesty characterized his business dealings. Mr. Underhill began his business life with Paul C. Coffin, a well-known Hardware merchant, and later entered the employ of William F. Hyatt, with whom he was associated until 1876, when a partnership was formed with Oscar A. Spencer, under the firm name of Spencer & Underhill, which firm were succeeded in 1884 by Underhill, Clinch & Co., composed of Edgar Underhill, Alfred D. Clinch and William W. Glover. Mr. Clinch and Mr. Glover were employees of Spencer & Underhill, Mr. Clinch since 1877 and Mr. Glover since 1876. In 1900 Mr. Underhill's son, Frederic E., entered the firm, and in 1902 Mr. Glover retired.

Mr. Underhill was an intense American, deeply interested in American history and the welfare of the country. He was a Republican in politics and an Episcopalian in religion, giving charity unostentatiously to many. He was a member of the Sons of the Revolution, Society of Colonial Wars, Society of War of 1812, Veteran Corps of Artillery, New York Historical Society and Metropolitan Museum of Art. The funeral services were held in the family home, New York, January 26, the interment being in Sleepy Hollow Cemetery, Tarrytown, N. Y.

HARDWARE ASSOCIATION MEETINGS.

THE following meetings of State Retail Hardware associations are announced to be held during the next few months:

WISCONSIN, February 3, 4, Milwaukee.
NEBRASKA, February 9, 10, Omaha.
NEW ENGLAND HARDWARE DEALERS' ASSOCIATION, February 10, Boston.
IOWA, February 10, 11, 12, Des Moines.
COLORADO, February 15, Denver.
INDIANA, February 16, 17, 18, Indianapolis.
PENNSYLVANIA, February 16, 17, Williamsport.
ILLINOIS, February 23, 24, East St. Louis.
MISSOURI, February 23, 24, St. Louis.
OHIO, February 23, 24, 25, Cleveland.
MINNESOTA, February 24, 25, 26, St. Paul.
CALIFORNIA, March 2, 3, San Francisco.
NEW YORK, March 8, 9, 10, Rochester.
NATIONAL, March 15, 16, 17, Indianapolis, Ind.
INDIAN TERRITORY, May 10, Oklahoma City.
ARKANSAS, June 14 and 15, Little Rock.
MICHIGAN, August 10, 11, Grand Rapids.

VAN CAMP HARDWARE & IRON COMPANY.

VAN CAMP HARDWARE & IRON COMPANY, Indianapolis, Ind., expect early in the spring to commence the erection of a large new building to accommodate their steadily expanding business. The structure will be 200 feet square, eight stories high and will contain 9 acres of floor space. Its cost is estimated at $300,000. The company's business has outgrown their present facilities, so that enlarged quarters are necessary. The new establishment will also enable them to extend their territory and enlarge the scope of their operations.

NEW ORLEANS NOTES.

FROM A SPECIAL CORRESPONDENT.

WHEN good news becomes monotonous, and all changes are for the better, a trade may be said to be in a flourishing condition. Extreme optimism is as much a fault as the other extreme, and as prone to err, but hard cash and cold facts sometimes form the basis for enthusiastic reports. Such is the status of the Hardware trade out from New Orleans, in the opening two weeks of the new year in all, save one line, and to all save one section. In this the leading Hardwaremen of the city are agreed. The trade, local, domestic and export, is upon a rapid increase. New houses and headquarters are being planned for, and new departures are daily being inaugurated. There is a promised widening of the range of transportation facilities to foreign markets equaled only by the strides of the distributing and concentrating agencies, the railroads, during the year just gone. Cotton continues to soar at a level unheard of for over 40 years. Rice lands continue to be opened up, and even the sugar planters have not lost their credit with the jobbers and wholesale men.

Before Christmas there had been a threatened uplift in prices on bulk goods, which was partially realized. Trade responded promptly to it, and when the tendency died away was not much affected thereby. The holidays brought a lull of a few days, but a very few. After the new year the firmer tone in iron and steel lent confidence to the trade throughout Mississippi, Louisiana, Texas and Arkansas, and business quickened with a rush. Movements have been particularly heavy in Nails, Bar Iron, Sheet Roofing and other heavy bulk goods. One firm alone shipped 15 carloads of Nails into Western Louisiana to the booming rice country, while another had almost equally good fortune into the cotton region in North Louisiana and Mississippi. Much of this was sent direct from the Pittsburgh factories upon New Orleans orders, but a considerable portion was routed through New Orleans from the local warehouses.

Mill supplies have kept almost equal pace with the goods just mentioned. The time has come in the season when repairs are being made in cotton gins, saw mills and rice mills. It is the mid-fiscal-year house cleaning period. The cotton gins will run for several weeks more, or into the second fortnight in February, save in Texas and the eastern portions of Mississippi, where the crop is already in the markets. The sugar houses are through work for the year, and to these a smaller quantity of supplies is going than to any other sort of the trade. The lumber district is widening, and recently a considerable demand has been created for Mill Supplies by the inauguration of new mill enterprises and the building of new logging roads. Much of this demand is supplied directly from the Northern factories, but New Orleans has been making vigorous efforts to control all the trade within her own territory.

Household Hardware, the trade agrees, has not kept pace with the increase in other branches of the trade, although it has materially increased. The demand has been for industrial and commercial purposes. People have been too busy making money and extending investments to indulge in personal luxuries or improvements. It is expected that this line of trade will not undergo any very appreciable improvement beyond the natural growth until after the spring lull.

The domestic demand for Building Hardware has ranged between that for Household Hardware and that for Mill Supplies, &c. The local demand promises better than it did several weeks ago. The threatened war in the building trades seems not so imminent as it did before the holidays. The Building Trades Council has elected a conservative set of officers, and the Employers' Association has adopted conciliatory methods with the workmen with the hope of averting a crisis when the spring work begins. Consequently there is a general feeling with the contractors that business will be more brisk than was expected. Already several large contracts are upon the market that will create considerable demand.

Several shiftings in the agricultural sections have exercised influence upon the demand for implements, and have, to a certain extent, upset the year worn methods of appealing to the trade. Throughout the cotton belt, in all the States tributary to New Orleans, there is a tendency to adopt modernized systems of crop growing, and this has called for improved implements. Further, intensive farming has been adopted upon the older soils of the several States, and Fertilizer Distributing Implements are in demand. The simple Plow, Cultivator, Hoe and Planter have been gradually giving way to the Wheeled Sulky Plows, the Gang Cultivators, the System Hoes and the Seeders. This tendency has received a great impetus this year from the extraordinarily high price of cotton. All along the Northern border of the sugar belt thousands and thousands of acres of cotton will be grown this season upon land which has formerly been placed in sugar cane year after year. The demand for new equipment will be very heavy from this section, and the local houses are now endeavoring to meet this trade half way. The change in equipment will apply chiefly to the implements used for cultivation after the crop is out of the ground and will be delivered during March and early April. West of New Orleans, for 300 miles along the Southern Pacific and the Texas Pacific railroads, the rice lands are drawing new people, calling for new houses, new Rice Farming Equipment and new Drainage Machinery. There is a struggle between the jobbers in New Oreleans to get this trade. Much of it is supplied through the agencies for the big firms in the North, with which the Northern immigrants are already familiar. To this the sugar belt is a contrast, in that the planters are buying only what is absolutely necessary, and are postponing even these purchases as long as is consistent with good policy. However, the credit of the sugar men has remained good, and there have been no failures of consequence among them, despite low prices and a poor crop added thereto.

Attention to export opportunities has never been so keen as at the present moment. It was announced several days ago that there would be established during the coming year a direct steamship line from New Orleans to South Africa, and another to Mediterranean ports in Northern Italy, to which there is not now such means of transportation. The steamship line to South Africa has been rendered possible by large contracts which have been made by New Orleans firms with South African purchasers for supplies for the railroad extensions which are contemplated in that section. Delivery of these goods will begin next autumn. The Macheca Bros., for many years intimately connected with the steamship business to Spanish America, are the local movers in this venture, while with them is John A Kirby, the Texas lumber king. The news of this venture had no sooner been verified than a number of the local Hardware dealers took steps to get themselves before the South African public with samples of the goods which might be desired in that section. This was done particularly in the line of Agricultural Implements and Building and Structural Tools. The new line of steamers into the Mediterranean has been rendered possible by the diversion to New Orleans from New York of the Italian fruit imports which arise in Genoa and Palermo, at the two ends of the Italian peninsula. The first ship will soon arrive in New Orleans. She will fly the Italian flag, as will the other ships of the line, which have been chartered by the Italian merchants to battle with the present monopolizers of the fruit carrying trade. To Spanish America the attention of the dealers is also directed. The projected "Progressive Union Heads of Houses Excursion" was postponed until after the carnival in obedience to the request of a number of the dry goods the cotton men. However, a special group of Hardware merchants will leave New Orleans one week from to-day for a tour even more extensive than that contemplated by the Progressive Union. In the party will be represented Stauffer-Eshleman & Co., A. Baldwin & Co., the Failbanks Agency, and a number of the Implement and Vehicle agencies. This party will carry out the plans they had intended putting into execution upon the Progressive Union expedition.

In the city there are to be a number of improvements

and developments within the next few months. Woodward-Wight & Co., are to enlarge and increase their wareroom capacity, and will perhaps erect a new building for the general offices. A. Baldwin & Co., are to reorganize the floor space of both the wholesale and retail departments in order to better accommodate the increased business. Stauffer-Eshleman & Co., are to follow suit. Nearly every agency in New Orleans has increased storage space.

A UNIQUE DINNER SOUVENIR.

DUNHAM, CARRIGAN & HAYDEN COMPANY, San Francisco, Cal., tendered their annual dinner to their traveling representatives on the 29th ult., at the Cosmos Club. In connection with the dinner, which was a very successful one, an attractive and unique souvenir was issued, the front cover of which presented exterior views of their main office and warehouses, the back cover giving views of their general sales department. The *menu* of the dinner appeared on the first leaf of the souvenir, the remainding leaves being occupied with the following original sketches and rhymes:

The dying year is sinking
'Twill soon be yesterday,
And each traveler is thinking
Of just how to "make his play."

While the boss with keen discerning
(Backed by figures and results)
Takes their temperature for earning
Through their expense account—the pulse.

And diagnoses with great skill
Till he spots a weakness lurking,
Then prescribes a large well-rounded pill
"To be taken while you're working."

"Sundries" he finds in perfect health,
"Miscellaneous" strong and gaining;
While "teams" of life enjoy a wealth,
And likewise "entertaining."

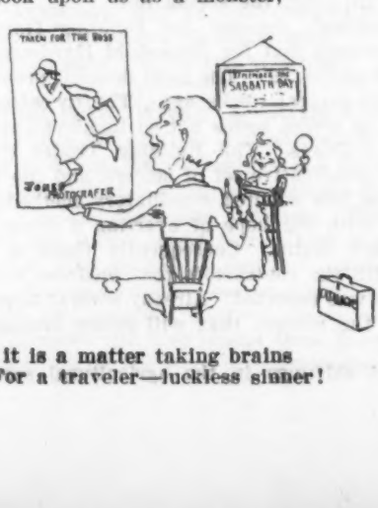
The heart action of the "profit side,"
He finds a trifle weak,
"Repairs to Spring and Wagon Tongues"
A little coated—so to speak.

"Good Prices" have an awful pain
And "Carload Lots" a spasm;
The "Iron Agreement's" sick again
With Association-asm.

The patient groans while telling
(Ashen-faced with all his ills)
"Why what's the use of selling
We can never get the bills."

"And he who watches o'er our course
With maps and routes and table,
Should not expect a livery horse
To always leave the stable."

"Nor should the President or Vice
Or the one who stands as Sponsor
For the Credit or the price
Look upon us as a monster,"



As it is a matter taking brains
For a traveler—luckless sinner!

Who is supposed to be catching trains
To be comfortably home at dinner.

And how do you suppose that we
Can get home every Sunday—
Unless we jump from Redding, see—
To here—and out on Monday.

Enough, enough—we've plenty heard
There's two sides to this case,
And we'll not hear another word
For we've trouble new to face.

They're dishes seasoned with Good Cheer
And a bit of sparkling wine,
So come a toast—a good New Year
To you and me—to yours and mine.

TRADE ITEMS.

AUGUSTUS MASCHMEYER, formerly of A. J. Jordan Cutlery Company, St. Louis, Mo., has assumed management of the New York branch of R. Wallace & Sons Mfg. Company at 226 Fifth avenue. At this branch he will carry a complete line of samples of the Wallace Company's manufactures, consisting of Sterling Silver Ware, Plated Ware, Hotel Ware and Fine Cutlery.

THE HARTFORD BEDSTEAD COMPANY have been succeeded by the Hartford Woven Wire Mattress Company, Hartford, Conn., manufacturers of Metalic Bedsteads, Asceptic Furniture, Wire Bedsteads, &c. The organization of the new corporation has been completed with the election of these officers: President and treasurer, Lieutenant-Governor Henry Roberts; secretary, Robert R. Pease, and assistant treasurer, Frederick W. Grant. They will manufacture in the plant of the Hartford Wire Mattress Company.

THE CANTON DROP FORGING & MFG. COMPANY, lately organized at Canton, Ohio, capital stock $25,000, expect to begin operations on or about the first of February in their new plant. The plant is equipped with one 2000-pound hammer and one 1000-pound hammer of the latest design. The officers of the company are James B. Welder, president; James Anderson, vice-president; John Stein, secretary, and C. H. Schlabach, treasurer.

THE differences between the former owners of the business of the Household Sewing Machine Company of Providence, R. I., and the present management have been settled, and the litigation begun by the old owners to recover from the new has been brought to an end by agreement of parties. The plant which was temporarily shut down is now in operation again. The manufacture of the Household Sewing Machine will be continued, and in addition the company will branch out and do any sort of metal and wood machine work, foundry work in grey iron, malleable iron and brass castings, and cabinet work and interior finishing. The present management consists of F. H. Cooper, president; W. B. Wolff, vice-president; Charles A. Cooper, treasurer, and William L. Weber, general superintendent.

THE KOKOMO BIT AND TOOL COMPANY, Kokomo, Ind., have been incorporated with a capital of $10,000 by H. C. Davis, H. C. Davis, Jr., and George J. Castello. These parties are also identified with the Rockford Bit Company, who contemplate the manufacture of additional lines.

DETROIT TRUST COMPANY, Detroit, Mich., as trustees under mortgage given by the Buckley-Hart Mfg. Company for the benefit of their creditors, are offering for sale their entire properties, consisting of Lathes of various descriptions, Cleveland Automatic Machines, Power Machinery and Tools. Also the patents, patterns and good will pertaining to their Lawn Sprinklers and other Hose articles, Mail Boxes, Stove Pipe Shelves, Sanitary Supplies, Brackets, also Billiard Table Accessories and Cue Locks.

MARTIN KUNKEL, for the past 33 years in the Hardware business in Davenport, Iowa, died on the 5th inst. Mr. Kunkel was born October 28, 1833, in a little town in Bavaria, Germany. At the age of 23 he settled in Marshalltown, Iowa. From 1861 to 1864 he served in the Civil War, when he returned to Marshalltown, shortly afterward removing to Davenport, where he entered the employ of Kelley & Mack, Hardware dealers. Here he continued until 1871, when he entered business on his own account. In 1900 his two sons, Fred. H. and Walter J. Kunkel, were taken into the business, the style becoming M. Kunkel & Sons.

FRED. L. LAVENBURG, maker of a large line of Dry Colors, with office at 100 William street, New York, and factory in Brooklyn, has for the past 20 years been an extensive manufacturer of Paris Green, known as the "Star Brand." The small packages are attractively put up in paper boxes, with red labels and tops. For the coming season he will sell directly to the Hardware trade. Every pound of this Green is guaranteed by the manufacturer as being absolutely pure, and it is referred to as being approved by Agricultural Experiment Stations throughout the United States.

THE PETERS CARTRIDGE COMPANY, Cincinnati, Ohio, had their annual reunion of salesmen at Cincinnati, January 11 to 15, inclusive. A souvenir programme reproducing in shape a loaded Shot Gun Shell, in addition to a novel *menu* for the banquet held at the Business Men's Club, January 14, where were also on preceding days a supper and salesmen's smoker, announced the various conferences with salesmen, addresses and general instructions, theatre party, inspection of factories, shooting exhibitions, &c., occurring during the week. The programme, in addition to the officials at the Cincinnati, New York, Pittsburgh and St. Louis offices, also gives the names of 26 salesmen in contrast with the two employed six or seven years ago, thus bearing striking testimony to the company's growth.

WILLIAM W. SUPPLEE was unanimously elected president of the Philadelphia Trades League on the 25th inst., at the organization of the new Board of Directors, succeeding W. W. Foulkrod, who declined re-election after having been nominated for the position, which he has held ever since the organization of the league in 1891. The other officers elected, who were also the unanimous selection of the board, were: First vice-president, Mahlon N. Kline; second vice-president, Coleman Sellers, Jr.; secretary, N. B. Kelly, and treasurer, Richard L. Austin. Mr. Supplee has been a member of the Trades League ever since it was organized, and has been chairman of the Finance Committee for more than ten years. Lately he has been the first vice-president.

Bullis & Fitch have opened a new Hardware store, at Hardwick, Vt. Their line includes Shelf and Heavy Hardware, Stoves, Tinware, Paints and Oils, Sporting Goods, Glassware, Crockery and House Furnishings.

FACTORY COST AND BUSINESS METHODS.

THE FACTORY AND OFFICE SYSTEM OF THE ATLAS MFG. COMPANY.

The Rules for the direction of the Manufacturing Department, which were commenced in last week's issue, are continued below, and will be completed in next week's installment. This will be followed by a description of the Stock Room and the Office System.

PART IV.

PLAN OF KEEPING TRACK OF WORK.—Page 52

SEC. 19. Each operative is furnished with a time ticket for each job he is working on. The times of commencing and finishing work on each job are registered by means of the self registering clock. (See Page 50a, Sec 3.)

SEC. 20. In addition to the time spent on each job, is noted on these tickets,[20] the quantity of work done, the amount of scrap made from the following causes: Carelessness, defective machinery, defective material, the number of pieces fixed and the cost of fixing them, also

OPERATOR NO .....

SCRAP (pieces) made from

LOT NO	Carelessness	Defective Machinery	Defective Material
19	7		
Total Each			

Total Scrap Made, Pieces .....
Amount Scrap Fixed, Pieces .....
Amount Irredeemable Scrap .....
Cost of Fixing .....

ARTICLE 4 x 5 Bracket
Operation # 6
Lot Nos. 19
Amt in each Lot 5000
Amt of Work Done 5000
Total Hours 14
Quantity per Hr 357
RATE PER HR 20¾
Wages Earned 2.95
Charged for Scrap .....
Charged for Fixing .....
Charged for Damage .....
Total Charge .....
NET WAGES DUE .....
No. of Half Days Late .....

Fig. 18.—Back of Work Ticket.

the quantity of irredeemable scrap remaining. These items are taken from the "Scrap Tag," as explained in Section 28.

SEC. 21. The "quantity of work done" is entered on the ticket as far as possible in completed lots. To facilitate doing this the tickets are arranged with two Saturday and two Monday spaces,[21] so that the beginning or finishing of a lot may lap over a little from one week to another.

SEC. 22. In order that the correct number of pieces shall be maintained through all the operations, each lot is to be taken account of as to the quantity at the first operation and verified at the last operation and at as many points between as seems necessary.

SEC. 23. As the *parts* of *goods* on any order are completed, they are to be disposed of as follows: Such as are needed as material for other runs are to be used in this way, and a memorandum of total quantity used handed to the office upon completion of the order; such as are not needed are to be delivered from time to time as they are completed to the store room. In this case

Table showing Quantity per hour, the Total Quantity, and Time being given.

Hours	125	250	333	500	667	750	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
12	10.5	21	27.8	42	55	63	83.3	167	250	334	420	500	584	668	750	835
12¼	10.2	20.9	27.2	40.8	54	61	81.6	163	244	326	408	488	570	652	732	816
12½	10	20	26.7	40	53	60	80	160	240	320	400	480	560	640	720	800
12¾	9.9	19.8	26.4	39.7	52	59.4	79.5	159	235	314	397	476	549	628	705	785
13	9.6	19.2	25.7	38.5	51	57.6	77	154	231	308	385	462	593	641	693	770
13¼	9.4	18.8	25.2	37.7	50	56.4	75.5	151	226	302	377	452	528	604	678	755
13½	9.2	18.5	24.7	37	49	55.5	74.1	148	222	296	370	444	518	592	660	740
13¾	9	18.1	24.2	36.3	48	54.3	72.7	145	218	290	363	436	508	580	654	727
14	8.9	17.8	23.8	35.7	47	53.4	71.4	143	214	286	357	428	500	572	643	714
14¼	8.7	17.5	23.4	35.1	47	52.5	70.2	140	211	281	351	422	491	560	633	702
14½	8.6	17.2	23	34.5	46	51.6	69	138	207	276	345	414	483	552	621	690
14¾	8.4	16.9	22.6	33.9	45	50.7	67.8	136	203	272	339	406	475	544	609	678
15	8.3	16.6	22.2	33.3	44	49.8	66.7	133	200	266	333	400	466	532	600	667
15¼	8.1	16.3	21.8	32.7	44	48.9	65.5	131	196	262	327	392	458	524	592	658
	125	250	333	500	667	750	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000

Fig. 19.—Chart for Finding the Average Number Made Per Hour.

they are to be accompanied with a memorandum stating the quantity delivered and the number of the order on which they apply. This memorandum is to be checked by the store room clerk and handed into the office for entry on the Running Inventory. (See Page 54, Sec. 33.)

SEC. 24. As *completed goods* on any order are completed they are to be delivered to the finishing room. The only record made of goods thus disposed of is the memorandum required for the Daily Record. (See Page 54, Sec. 34.)

SEC. 25. In addition to the above, the Completed Order[22] should show, when returned to the office, the

Shelf Brackets.

Number of pieces required per hour to earn the several rates of wages as stated—

No.	Operation	Size of Bracket	Highest Record
6	Forming Wires	4x5	

Fig. 20.—Part of Page of List of Premium Prices in Piece Price Book.

amount of tare if any, and the amount of any material returned to store room. The other items on Completed Order are to be filled out by the office from their records.

SEC. 26. All "Unproductive Labor" is to be recorded on a separate ticket, the character of the work being noted in each case. An absent ticket is issued as explained in Page 50a, Sec. 3.

PAYING FOR THE WORK.—Page 53.

Work is paid for in five ways.

a. *Daywork*—by the hour.

b. *Piecework*—by the gross or 1000.

c. On the *Premium Basis.*

In this latter plan, a certain rate per hour is guaranteed and an additional rate paid for higher rates of

[20] The front of the work ticket, Fig. 14, was shown last week. The back of this ticket is reproduced in Fig. 18. From this it will be seen that 5000 brackets were worked on and that seven pieces of scrap were made from carelessness in 14 hours' time. In practice the help are seldom charged for the scrap made. Such a close record of scrap is kept simply because there was a much larger quantity of scrap produced before the record was kept and scrap in this kind of work very quickly eats up the profits. The moral effect of having the operators fill this item in on the ticket before it goes to the office has been very good.

[21] See Fig. 14.

[22] The completed order means the original order for manufacturing goods illustrated in Fig. 16 and published last week.

production than the standard.[33] Scrap through carelessness and other damage done is deducted.

[33] Considerable experimenting has been done to determinate the best way of paying the help. The so-called Premium Basis has been found to be the most satisfactory and is in general use in the factory. It is worked as follows: From the back of the work card, Fig. 18, it will be seen that 5000 pieces were made in 14 hours, an average of 357 per hour. It is not necessary to divide each time to determine this result, for it is obtained by direct reading from a large chart that has been prepared. A portion of this chart is shown in Fig. 19. In the left hand column are the figures from ¼ to 60¾, representing hours worked, and across the top, the headings of vertical columns, are numbers 125 to 10,000, representing the number of pieces worked on. To find the average number of pieces worked on per hour when 5000 pieces were made in 14 hours, read down the column headed 5000, and where the horizontal line representing 14 hours crosses it will be found the average number per hour, or 357. When this is obtained it is so noted in the office on the back of the work ticket, Fig 18. It will be noticed that in Fig. 19 a strip of celluliod ruled and marked the same as the headings of the columns is placed over the chart. This is done so as to make it easy to follow across a horizontal line with the eye, and then to avoid the necessity of looking up to the head of the column. The rate paid for the work, by the system used, varies with the amount of work produced per hour, a higher proportionate rate being paid for the more rapid and efficient work, as is shown by Fig 20, which is copied from the list of premium prices in the Piece

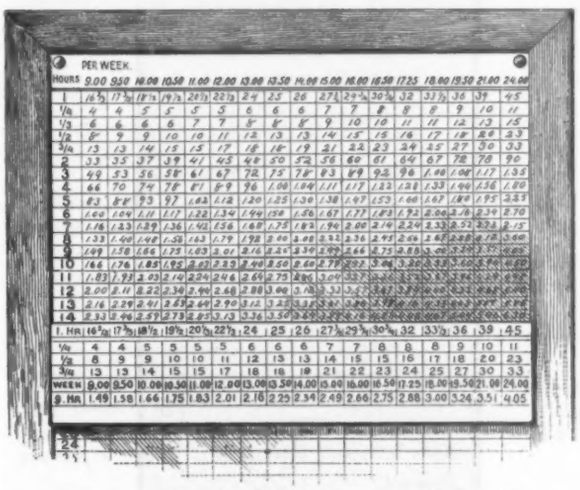


Fig. 21.—Chart for Determining Amount Earned.

Price Book. This book contains all the piece prices paid on the various kinds of work in the factory. Referring to this, it will be observed that operation No. 6, forming wires on 4 x 5 brackets, pays 18½ cents an hour for 250 produced per hour, 19½ cents an hour for 275 produced per hour, 20 1-3 cents an hour for 315 produced per hour, and 22 1-3 cents an hour for 360 or more produced per hour. As 357 were produced an hour, the operator is entitled to pay at the same rate as if 315 had been made, or 20 1-3 cents. This is noted on the time card, Fig. 18. The wages earned, which is the Total Hours multiplied by the Rate Pay per Hour, is then obtained. Instead of multiplying this out, this result is gotten by direct reading from a chart, a portion of which is shown in Fig. 21. In this the left hand column shows the number of hours worked, and the headings for the vertical columns, the pay per week and per hour. Referring to the number of hours worked in this case 14, to where this horizontal line intersects the vertical column for 20 1-3 cents per hour, we get the amount earned, or $2.85. This amount is transferred to its proper place on the work card, as shown in Fig. 18. A celluloid card somewhat similar to that used on the chart shown in Fig. 19 is also used on the chart in Fig. 21, as is clearly shown. The success of this method of paying has been demonstrated to be satisfactory to both employers and employees. It may be added here that the several work and absent tickets for a week are turned into the office, and there the tickets belonging to each person are collated and bound together, one of the blank absent ticket forms being used for the front cover, as shown in Fig. 22. On the cover is noted the week, number and name of employee, the number of hours worked and absent, the rates of pay and the total wages paid. When the pay roll is made up, this card is stamped with the paid stamp, as shown. The tickets are then filed away for reference if needed.

d. "Fill in" work.

This is resorted to when a regular piecework or premium job is interrupted.

2. The pay will be the *average* hourly rate of all the piecework in the same week. There is therefore no loss in rate in the "fill in" work.

3. Any regular daywork is available for this purpose. If there is no daywork job on hand, "fill in" work can be provided by selecting a lot at some convenient operation and holding it out. This lot is to worked on by different persons as the need for "fill in" work arises, until that lot is completed, when it is to be returned to

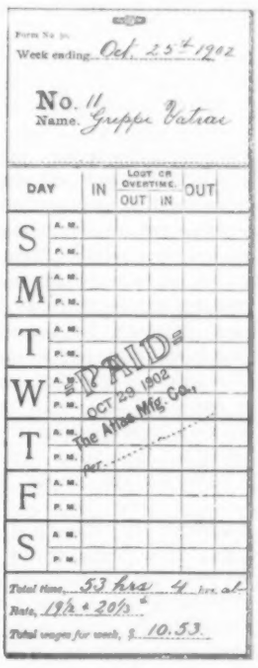


Fig. 22.—Time Tickets Bound Together.

its proper place in the run and the other operations performed in the regular way.

4. In making a selection *preference* should be given to articles that are not run continuously. Also no operation a daily record[34] of which is required, should be selected.

5. A separate ticket is to be kept for "fill in" work, called a "fill in" ticket.[35] All the *time* put in is to appear on the ticket, and also the work, but not the quantity, as this will be in broken lots, and the operation selected is one no daily record of which is required.

6. Work should not be done on the "fill in" basis except as a convenience in finding work for the help during short interruptions in the regular piecework. Should an interruption promise to be prolonged, a new piecework job should be given out and the lot thus started be completed before going back to the regular job.

e. Schemes for offering special premiums or prizes,[36] and placing penalties, &c.

(To be continued.)

[34] This refers to the Daily Record, described on Page 54, Sec. 34.

[35] One of the regular work tickets is used for this purpose.

[36] Special prizes have sometimes been given for producing more than the required amount of work, with varying results. Prizes of money have not worked as well as theater tickets. This may be partly due to the fact that many of the help are required to bring their pay envelopes home unopened. Tickets to the 10, 20 and 30 cent vaudeville house in New Haven have been largely sought and are more appreciated than their cost in cash.

BRITISH LETTER.

Offices of *The Iron Age*, Hastings House, Norfolk St., London, W. C., January 16, 1904.

The Week's Hardware Trade.

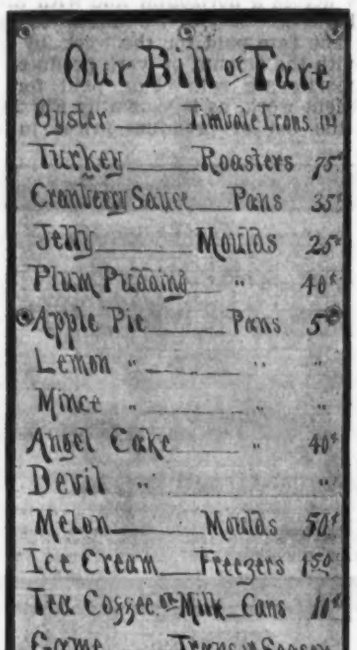
TRAVELERS have not yet gone out on their New Year's travels, so that as yet it is too early to prognosticate the general trend of trade after the holidays. In the shipping department there is uneasiness at the continued lull in South African demand, which is attributed mainly to the stringency of the monetary situation in Johannesburg and the heavy stocks held in all the colonies. From Australia and New Zealand, however, better indents have come to hand during the last few days, and the improvement in orders from Canada and South America is well maintained. The conciliatory action of Germany in recognizing that colonial tariff arrangements with the mother country are matters of domestic concern, which will not be allowed to affect the rights of Great Britain and her colonies to any preferential treatment to which they may be entitled under commercial treaties with other countries, is regarded by many business men as a most hopeful augury. Business with the Far East continues to be restricted, owing to the uncertainty as to war or peace. In conversation only this morning with a trader just back from Yokohama, who represents American interests, he informs me that he regards war as absolutely certain; if not now, then in five years' time. He informs me that the Japanese are enthusiastically in favor of war, and that the general opinion in Japan is that strategically it would be better to precipitate hostilities now than wait for a longer period, during which Russia could strengthen her position.

The tendency, undoubtedly, is toward a weakening of prices. The Wrought Iron Tube trade has been in a languid condition of late, but at the quarterly meeting at Birmingham last Thursday an advance of 2½ per cent. in discounts was announced. This reduction was rendered possible by the consent of the Tube Strip makers to reduce prices 5 shillings per ton. Other reductions in prices are to be noted, particularly Galvanized Sheets, reduced 10 shillings. Among the departments where business is doing, large Tanks and Boilers are in good demand, but there is not so much doing in the smaller kinds of Tanks and Cisterns, such as are required for household purposes or for packing for export. Door and Lock Furniture makers are fairly busy, and there are some valuable contracts under execution for Locks for public buildings. The brass foundry trade as a whole is rather quiet, but that is quite usual at this time of the year. On the other hand, the makers of Stair and Picture Rods and other tubular work report favorably. Metal rollers complain not so much of the scarcity of orders as of the lowness of prices relative to the price of Copper. Employment in this branch is below the average, but the rollers of Yellow Metal are very busy, mainly on Indian orders. Wire drawers have good orders in hand for high conductivity Tape and Wire for electrical purposes. Cycle orders run more and more on the cheaper descriptions, but trade in good Motors is excellent. There is considerable activity in cheap Gas Fittings, mostly for the colonies and South America, and large Canadian orders are to hand for Fishing Tackle apparatus. There is a large output of Gun Locks for the better class Rifles and Fowling Pieces. A fair demand is reported for Galvanized Hollow Ware and the light iron founders are steadily engaged on Tin Hollow Ware and Builders' Castings. Orders for Japanned goods are scarce. There is a steady demand for Iron Hurdles and Fencing of various kinds, together with Iron Gates and Ornamental Railings. Builders' Ironmongery is in slow request.

In the lighter Sheffield trades testimony is much divided as to the actualities of the present position. It is undoubtedly a fact that many houses experienced in the autumn of last year a serious decline, but, as I have already pointed out, a number of large houses are doing a large and remunerative colonial and foreign trade, and have managed to keep their employees continuously at work during the autumn. They only closed their works for the usual few days at Christmas. Rumors in Sheffield are current as to the closing down of a number of departments in Silver, Electroplate and high-class Cutlery. Color is lent to the general decline in the Sheffield trades by the increase in the number of the unemployed. Sheffield retailers report diminished receipts as compared with Christmas seasons of recent years. On the other hand, the people are pleasure-loving, and when one observes that during the Christmas week no less than $10,000 was spent in admission to football grounds in the district of Sheffield, one may at least be sure that matters might be worse.

HARDWARE MENU BULLETIN BOARD.

THE accompanying illustration is a photographic reproduction of a bulletin board, displayed about holiday time by the Seavey Hardware Company, Fort Wayne, Ind. The bulletin board was placed on the sidewalk in front of the store, and attracted considerable attention and caused much favorable comment. The company suggest some additions to the bill of fare, which may be of interest to our readers:



Hardware Bulletin Board.

Soup	*Ladles*	*.10*
Oyster Pattie	*Pans*	*.01*
Turkey	*Roasters*	*.75*
Potato	*Mashers*	*.10*
Boston Baked Bean	*Pots*	*.85*
Cream Slaw	*Cutters*	*.20*
Sunshine Cake	*Pans*	*.40*
Fruit Cake	*Pans*	*.40*
Sponge Cake	*Pans*	*.10*
Plum Pudding	*Moulds*	*.50*
Fruit	*Presses*	*.40*

THE TIPPIT NUT LOCK COMPANY, Bluffs, Ill., have been incorporated to manufacture and sell the Tippit Nut Lock. The company expect to be able to supply the Nut Locks in large quantities by spring, and can fill small orders at present on 60 days' notice. Wm. McCaleb is president, Wm. H. Tippet is secretary, Frank Linkins, treasurer, all of Bluffs, Ill.; C. J. Ringe, Trenton, Mo., is vice-president.

JOHN D. WARREN MFG. COMPANY, Chicago, Ill., manufacturers of Shelving, Cabinets and other equipment for Hardware establishments, advise us that their business has not been affected by the fire in the Masonic Temple Building, in which their offices are located.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM I. N. PRICE & SON, Casey, Ill., who have lately opened in the Shelf and Heavy Hardware, Stove and Tinware, Paint, Oil and Sporting Goods business.

FROM W. J. PORTER, Boonville, N. Y., who has recently purchased Chauncey W. Colton's Hardware, Stove, Agricultural Implement, Paint, Oil, Sporting and House Furnishing Goods business.

FROM R. D. BUMPASS, who is successor to Lawler & McDamel in the wholesale and retail Hardware, Stove, Agricultural Implement and Sporting Goods business at Abilene, Texas.

FROM W. M. HINDE HARDWARE COMPANY, Fairfax, Mo., who are successors to Butler & Wright in the Hardware, Stove and Sporting Goods business.

FROM WAGNER & DENTZER, who have lately opened up in business at Reading, Pa., handling Shelf Hardware, Stoves and Tinware, Paints and Oils and Sporting Goods. Messrs. Wagner and Dentzer were formerly connected with the Stichter Hardware Company.

FROM CHARLES E. HARRIS, who has bought the Barber Hardware, Agricultural Implement and Manufacturers' Supply business at Rockville, Conn.

FROM WALKER & HARRIS, Helena, O. T., who have lately established themselves in the Hardware, Stove, Agricultural Implement, Paint, Wagon and Buggy business. They occupy a new building 25 x 100 feet.

FROM LONG BEACH HARDWARE COMPANY, Long Beach, Cal., who have been incorporated, with a capital stock of $25,000, $15,000 subscribed, to carry on the wholesale and retail business in Shelf Hardware, Stoves, Paints and Oils. T. H. Brown is president and J. E. Carter, Jr., secretary and treasurer.

FROM A. F. RIECHERS & SON, who have succeeded C. M. Lambert in the general Hardware business at Adams, Neb.

FROM W. F. PATRICK, Webberville, Mich., who is successor to Alchin & Son in the Hardware, Stove, Agricultural Implement, Paint and Sporting Goods business.

FROM MASTERS & MORRIS, Keota, Iowa, who have bought out Dayton & Vail in the Shelf Hardware, Stove and Sporting Goods business.

FROM LOWRY & HUNT, who have just opened up in the general Hardware and Machinery business at Madisonville, Tenn.

FROM W. E. MALPASS HARDWARE COMPANY, East Jordan, Mich., who are handling General Hardware, Stoves, Ranges, Farm Tools, Lumbering Tools, Bicycles, &c. They desire catalogues and price-lists from manufacturers and wholesale merchants relating to the goods in which they are interested.

FROM FLORALA HARDWARE COMPANY, Florala, Ala., who will be pleased to receive catalogues and price lists pertaining to general Hardware, Mill Supplies, Sporting Goods and Bicycles.

FROM E. H. MASON, Woodhull, N. Y., who was recently burned out. Mr. Mason's collection of catalogues was also lost, and he is desirous of replacing them with the latest issues from manufacturers of general Hardware lines.

FROM BILLINGS HARDWARE COMPANY, Billings, Mont., who have succeeded A. L. Babcock Hardware Company, and will continue the wholesale and retail Hardware business. Jacob Fischer is president of the new company; H. T. Davis, secretary and treasurer, and W. A. Selvidge, manager.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers issuing new catalogues or price-lists are requested to send to THE IRON AGE *two copies—one for the Catalogue Department in the New York Office, and one for the Iron Age Library of Trade Literature in London.*

THE H. B. IVES COMPANY, New Haven, Conn.: Illustrated catalogue and price-list, No. 11, devoted to Window Hardware Specialties. Some of the more recent inventions include a Window Ventilating Lock, Sash Cord and Weight Fasteners, and Specialties for Window trimming use.

WILLIAMS MFG. COMPANY, Northampton, Mass.: Catalogue and price-list of an extensive line of Baskets for a variety of purposes.

THE NATIONAL MFG. COMPANY, Worcester, Mass.: Descriptive pamphlet illustrating the Johnson Bilge Pump for rowboats and launches.

WEBSTER & PERKS TOOL COMPANY, Springfield, Ohio: Illustrated descriptive catalogue devoted to Wall Paper Trimmers, Seam Rollers, Smoothing Rollers, Folding Paste Tables, &c.

NATIONAL FIRE PROOF PAINT CORPORATION, 87-89 Frankstreet, Chicago, Ill.: Catalogues relating to Fire Proof Paints, to render wood work a permanent retardent against the spread of fire, as well as to afford protection from the elements; also Fire Proof Transparent Liquid, designed for accomplishing a like purpose.

BOWEN MFG. COMPANY, Fond du Lac, Wis.: Two catalogues. One catalogue, 68 pages and cover, illustrating 50 different styles of Refrigerators for domestic use, as well as for grocers, butchers, creameries, &c. A feature of this catalogue is the chapter on conductivity of materials and another on the Bowen Improved Lock. The trimmings of the Bowen Refrigerators are illustrated in half-tone cuts in which the bright nickel wire stands out against black backgrounds. A second catalogue of the same firm is devoted to the New Progress and Lenox Refrigerators, which are illustrated in about 20 styles.

ILLINOIS REFRIGERATOR COMPANY, Morrison, Ill.: Two catalogues, the larger of which is devoted to the Automatic and the Jewel types. About 60 Refrigerators are illustrated, and the method of building the insulating walls of the Refrigerator is illustrated in detail. A chapter is devoted to the Illinois Trap and another to the Porcelain Lined Water Cooler. Most of the Illinois Refrigerators have their ice chamber at the side instead of directly above the provision chamber.

CHALLENGE REFRIGERATOR COMPANY, Grand Haven, Mich.: Four catalogues, the largest of which is devoted to their Iceberg Refrigerators. It is 56 pages and cover and the illustrations of the Refrigerators are preceded by chapters on Charcoal Filling, Ball Bearing Casters, Drip Cups, and a good article on the theory of the circulation of cold air and advice as to the care of refrigerators. About 45 styles are illustrated by half-tone cuts of more than ordinary merit. This line embraces Refrigerators for domestic use, as well as for butchers, grocers, hotels, &c. The Victor Refrigerators of the Challenge Refrigerator Company are given a 28-page catalogue, which contains much of the same prefatory matter as the one just noted, and illustrates 17 styles of Refrigerators. The Grand Hard Wood Refrigerators of the same company are described and illustrated in a 24-page catalogue, 18 styles being illustrated. The smallest, but the finest, of these four catalogues is the one devoted to the Triumph White Enameled Refrigerators.

GRAND RAPIDS REFRIGERATOR COMPANY, Grand Rapids, Mich.: General catalogue, 128 pages and cover, with a prefatory plate in colors showing their Leonard Clean-

able Porcelain Lined Oak Refrigerators, followed by views of three of their factory buildings. A chapter is given on the Leonard system of refrigeration, another to a discussion of insulation and three to the Leonard Refrigerator lock, and other technical points are similarly discussed, with a very full dissertation on the reasons for calling their Refrigerator the "Cleanable." More than 100 styles of Refrigerators are illustrated by fine half-tone cuts, the Refrigerators being shown both open and closed.

GURNEY REFRIGERATOR COMPANY, Fond Du Lac, Wis.: Four catalogues. Catalogue No. 8 describes their Cold Wave Refrigerators and illustrates their removable, cleansable compartments. The book is 32 pages and cover, and describes about 30 styles of Refrigerators. Catalogue No. 9 describes the La Belle line, manufactured by that firm, in styles for both home use and for butchers, grocers, butter makers, &c. Catalogue No. 14, their general catalogue, is devoted to the Gurney Patent Refrigerators. The initial pages of the book show the Gurney plant and emphasize the claims of the Gurney Company as to the ease with which their Refrigerators may be kept clean. Circulation of air is discussed briefly and two pages are devoted to the discussion of the removable patented galvanized ice compartment. The mechanical construction of the Gurney Refrigerator is illustrated by drawings and described in detail in the text. About 35 styles are illustrated by means of half-tone cuts. A four-page circular catalogue is devoted to their Chinaline Refrigerator, a special feature of which is the fact that it is lined with heavy plates of china, which, in case of breakage, can readily be replaced.

MCCRAY REFRIGERATOR COMPANY, Kendallville, Ind.: Illustrated catalogues Nos. 39, 56 and 70, relating to Refrigerators, including odorless wood, opal glass and tile lined for residences; Refrigerators and Cooling Rooms for meat markets, groceries, hotels, public institutions, &c., Florists' Refrigerators, &c.

THE INDIANA MFG. COMPANY, Peru, Ind.: An attractive 66-page catalogue describing their North Star Refrigerators. They call particular attention to their Tile Lined Refrigerators, and state that their tile is nonporous and nonabsorbent, and has a smooth glazed finish; also that such portions of the Refrigerator, such as the shelves, pipe, top of provision chamber and door bindings, where it is impracticable to use tile, are finished with four coats of enamel thoroughly baked on, making them as sanitary and easily cleaned as the tile itself.

ALASKA REFRIGERATOR COMPANY, Muskegon, Mich.: Three catalogues. A general catalogue with artistic front cover lithographed in colors, 80 pages of text and illustrations showing in detail nearly 70 styles of Refrigerators and Water Coolers, prefaced with a chapter on the mechanical construction of the Alaska Refrigerators and the Alaska Patented Trap. A special catalogue on Alaska Tile Lined Refrigerators with cover in *fac-simile* of white tile, illustrating ten Tile Lined Ice Boxes. A catalogue of 40 pages and cover devoted to Alaska Grocers' Refrigerators as well as Beer Coolers, Butchers' Refrigerators and Cooling Rooms.

MICHIGAN BARREL COMPANY, Grand Rapids, Mich.: Catalogue No. 7, 78 pages and cover, illustrating more than 60 styles of Refrigerators for household, butcher shops, groceries, hotels and apartments. Strong claims are made for the sanitary results accomplished by their method of construction, as well as for economy in ice.

THE WISCONSIN REFRIGERATOR COMPANY, Eau Claire, Wis.: The Peerless Sanitary Refrigerators, for household, hotel, grocers' and butchers' use. Special emphasis is laid on the manner in which the ice is protected from outside heat, there being the following seven walls to preserve it: Outside case, prepared building paper, mineral wool, prepared building paper, air space, inside case, metal lining. Their cleanable flue wall and sanitary ice rack as well as other details of construction are illustrated.

CORBIN CABINET LOCK COMPANY, 11-15 Murray street, New York, and New Britain, Conn.: Catalogues illustrating and describing the lines of goods made in their different departments, Padlocks, Miscellaneous Cabinet Hardware in wrought and cast brass and bronze, steel, &c., and Trunk, Suit Case and Bag Locks and Trimmings.

CARL H. ARWE, 1348-1352 De Kalb avenue, Brooklyn, N. Y.: Price-list of Metal Goods, including Bar, Wine and Liquor Trade and Bottlers' Supplies.

WILLIAM JOHNSON, Hedenberg Works, Newark, N. J.: Price-list and illustrated catalogue of Carpenters', Cabinet Makers', Masons', Plumbers' and other Mechanics' Tools.

MARBLE SAFETY AXE COMPANY, Gladstone, Mich.: Illustrated catalogue of High Grade Sportsmen's Accessories. These include Safety Pocket Axes, Hunting and Boating Knives, Fish Knives, Automatic Gaff Hooks, Compasses, Match Boxes, Rear Sights, Broken Shell Extractors, Cleaning Rods, Shoulder and Seat Pads, Shell and Game Bags, Cartridge Carriers, Gun Slings, Racks and Cabinets, &c.

SAFETY DOOR HANGER COMPANY, Ashland, Ohio: Printed matter illustrating Safety, Storm King and World's Best Barn Door Hangers and Rail. The first two named Hangers are of the hinge or flexible variety, and are packed in white pine, dovetailed and glued boxes, with slide covers, one pair in a box, making convenient packages for retailers to keep on shelves.

DAVENPORT LADDER COMPANY, Davenport, Iowa: 1904 illustrated catalogue and price-list devoted to Single Spruce and Pine Ladders, Extension and Fire Ladders, Fire Poles, Hooks and Lifting Rods, Fruit Pickers' and Window Washers' Single and Extension Ladders, Step and Trestle Ladders, &c.

O. LINDEMANN & CO., 35-37 Wooster street, New York: Illustrated catalogue relating to Japanned, Brass and Tinned Wire Cages for canaries, finches, red birds, robins, mocking birds, parrots, monkeys, squirrels, mice, &c.; also Cage Supplies.

PITTSBURGH WOVEN WIRE FENCE COMPANY, Pittsburgh, Pa.: Catalogue of Pittsburgh Standard Field and Hog Fences, Wire Splicers and Fence Stretchers.

NEW YORK BELTING & PACKING COMPANY, 25 Park Place, New York: Illustrated pamphlet of their Indestructible Hose. This includes Air Brake, Air Drill, Steam, Brewers', Acid, Water, Fire and Pneumatic Tool Hose.

EAGLE LOCK COMPANY, Terryville, Conn.: Pages for insertion in their catalogue, volume 18, including illustrations and descriptions of Locks, also supplementary index.

SHELBY STEEL TUBE COMPANY, Pittsburgh, Pa.: Price-list No. 14, under date of January 1, relating to Cold Drawn Round and Square Seamless Tubing for mechanical purposes.

COLUMBIA NUT & BOLT COMPANY, Bridgeport, Conn.: Illustrated pamphlet relating to Lock Washer, to take the place of an ordinary nut and lock washer. The device is adapted to railway fish plates, locomotives, cars and car trucks, automobiles, carriages, axles, air compressors, power transmitters and different kinds of machinery.

THE STANDARD HARROW COMPANY, Utica, N. Y.: Illustrated catalogue E, devoted to the Standard line of Harrows, Corn Planters, Weeders, Field Rollers, Cultivators, &c.

HENDRICKS COMMERCIAL REGISTER.

THE thirteenth annual edition of Hendricks Commercial Register of the United States for buyers and sellers has just been issued. This work is especially devoted to the interests of the architectural, mechanical, engineering, contracting, electrical, railroad, iron, steel, mining, mill, quarrying and kindred industries. It is an annual index of these industries, said to contain over 350,000 names, addresses and business classifications, with comprehensive lists of manufacturers of and dealers in almost everything employed in the manufacture of material, machinery and apparatus used in these industries. It is published by the Samuel E. Hendricks Company, 76 Elm street, New York.

NATIONAL NOVELTY CORPORATION.

THE NATIONAL NOVELTY CORPORATION, with headquarters at 826-828 Broadway, New York, have recently absorbed the Kenton Hardware Mfg. Company, Kenton, Ohio. The Corporation are manufacturers of Toys, Juvenile goods and Hardware Specialties, and now comprise the following branches: American Rattan Works, St. Louis, Mo.; R. Bliss Mfg. Company, Pawtucket, R. I.; F. W. Crandall Company, Elkland, Pa.; Gong Bell Mfg. Company, E. Hampton, Conn.; Grey Iron Casting Company, Mt. Joy, Pa.; N. N. Hill Brass Company, E. Hampton, Conn.; Jones & Bixler Mfg. Company, Freemansburg, Pa.; Kalamazoo Sled Company, Kalamazoo, Mich.; Kenton Hardware Mfg. Company, Kenton, Ohio; Logan & Strobridge Iron Company, New Brighton, Pa.; Mason & Parker, Winchendon, Mass.; Manistee Novelty Company, Manistee, Mich.; Noble & Cooley, Granville, Mass.; Short Mfg. Company, North East, Pa.; S. A. Smith Company, Brattleboro, Vt.; J. & E. Stevens Company, Cromwell, Conn.; A. O. Speare Company, Gardner, Mass.; Thorndyke Turning Company, Baldwinsville, Mass.; Wilkins Toy Company, Keene, N. H.; Watrous Mfg. Company, E. Hampton, Conn.; Wing Mfg. Company, Kenton, Ohio and Whitney Reed Chair Company, Leominster, Mass. They are also sole selling agents for American Art Stone & Mfg. Company, Cleveland, Ohio; D. P. Clark & Co., Dayton, Ohio; M. Redgrave, Jersey City, N. J.; Roy Brothers, East Barnet, Vt., and Sterling Mills, Philadelphia, Pa.

MISCELLANEOUS NOTES.

Marble's Automatic Gaff Hook.

Marble Safety Axe Company, Gladstone, Mich., are manufacturing automatic spring gaff hooks in two sizes; No. 1, with a 7-inch spread, for fish weighing 1 to 15 or 20 pounds, and No. 2, with 11-inch spread, for fish weighing 10 to 60 pounds. These are well made, provided with turned wood handles of appropriate length, and the jaws can be opened by the foot. It is explained that it is only necessary to touch the fish to secure it, and that the fish cannot escape.

Nichols Bros.

Nichols Bros., manufacturers of butchers' tools at Greenfield, Mass., are getting out a new line of French Sabbatier knives for hotel and similar uses. The firm report an unusual demand for butchers' tools, which is referred to as due to the low price of beef in the carcass, which enables country storekeepers and other small dealers to go into business in the cold months, when they are independent of the ice supply.

American Tap & Die Company.

The American Tap & Die Company, Greenfield, Mass., are completing their lines by the addition of boiler taps and hob taps. They are planning to add a line of dies in the near future. The company's office has been removed from the factory to the office of Nichols Bros., to permit the former office space to be devoted to manufacturing purposes. Willis H. Simpson of 155 Chambers street, New York, is handling the American Tap & Die Company's product in New York and other large cities of the United States.

Samson Butcher Block Steel Brushes

Nafew & Gelston, 453 Canal street, New York, are manufacturing, in addition to a large assortment of wire brushes for varied purposes, the Samson butcher block flat wire steel brushes, here illustrated. The main features of each of the three brushes are identical, the different styles of handles making a choice to suit the user. The brush, intended for scraping butchers' meat cutting blocks, is made with thin blades of spring steel, hardened and tempered, and tinned to prevent corrosion, the blades being about 5-32-inch wide and approximately 1-64-inch thick. The brush has a patented wood placque placed midway between scraping end and backing, which keeps each blade firmly in place, at the same time giving the full elastic power, while preventing any tendency to

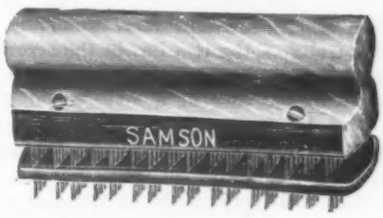


Fig. 1.—Samson Butcher Block Brush.

bend, break off or mat. As the blades are kept in original positions there is no lodgment for particles of fat and meat that cannot be readily reached and quickly

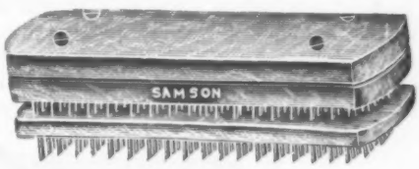


Fig. 2.—Brush with Different Block.

removed. The blocks are strong and heavy, and so shaped as to afford a good grip with one or both hands. There are no nails to loosen, screws only being used,

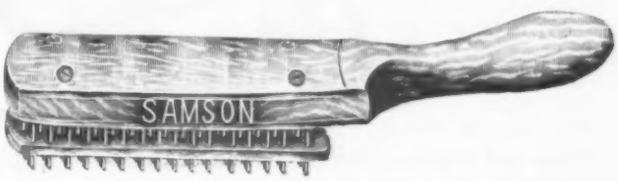


Fig. 3.—Brush with Extension Handle.

and the wood placque can be raised as the scraping points wear. The brush seen in Fig. 1 is catalogued No. 31, Fig. 2, 31A and Fig. 3, with extended handle, No. 32.

The Economy Revolving Nail Bin.

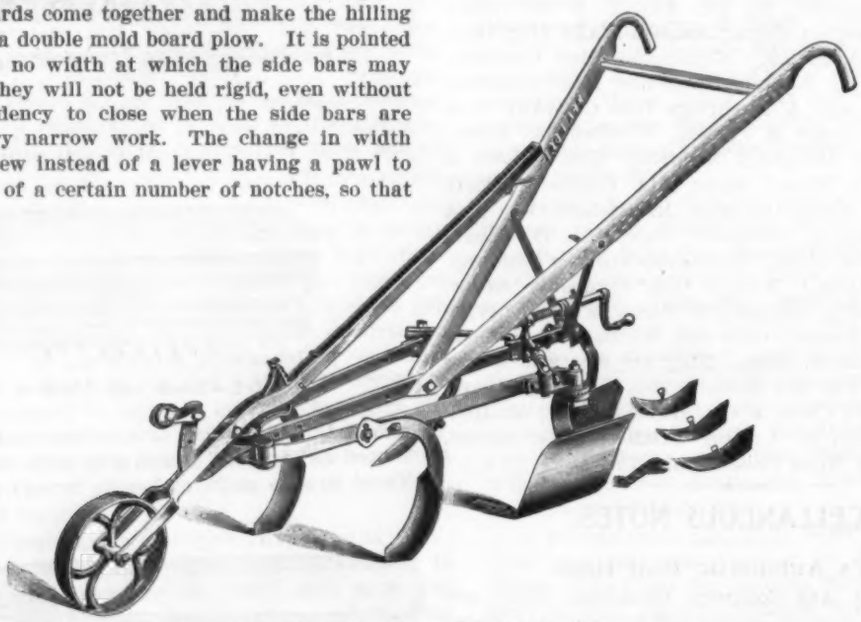
The Revolving Bin Company, Wellston, Ohio, are offering the nail bin shown herewith. It is 58 inches high, 48 inches in diameter, weighing about 250 pounds. Each section is composed of five bins, each of which will contain a keg of nails. When the bins are full, they therefore hold a ton of nails. The first section reaches 10 inches above the floor, the other sections being 16 inches

The Economy Revolving Nail Bin.

apart. Each section is on ball bearings, and each section is independent of all the other sections. When filled to its full capacity, it is explained, the bin revolves as easily as when empty. The stem of the bin is made of double strength gas pipe, and the bins of annealed sheet steel. It is shipped in a crated condition. The device is the invention of a practical hardwareman. The bin is referred to as not being an uncouth, unsightly encumbrance, but as a desirable addition to the furniture in any storeroom.

Iron Age Horse Hoe No. 8.

The accompanying cut represents the new Iron Age combined horse hoe and cultivator, now being placed on the market by Bateman Mfg. Company, Grenloch, N. J. The novelty of the tool lies in the screw expander. While it is not possible to expand and contract this tool as rapidly as in the case of a lever expander, such as has been used for some time, yet, it is explained, the rigidity is the same at any and every point, from the widest expansion, 28 inches to its narrowest, or a point where the standards come together and make the hilling blades pratically a double mold board plow. It is pointed out that there is no width at which the side bars may be set at which they will not be held rigid, even without the slightest tendency to close when the side bars are closed in for very narrow work. The change in width is made by a screw instead of a lever having a pawl to engage in a rack of a certain number of notches, so that it does not require a certain amount of change to hold it securely, but a very slight change may be made. The length of the expanding rods may be changed by loosening and tightening a set screw in a casting connected with the side bars. It is shown that this gives the facility for not only very wide expansion, but for setting one side bar in closer to the middle bar than the other, therefore the furrow which might be left by the side of the growing plants is avoided, because when set closer to the middle bar the rear tooth will fill in the furrow made. By this plan, it is stated, the crop will not be endangered by a furrow having been left to give an opportunity for the sun and wind to absorb the moisture and dry out the rootlets.



Iron Age Horse Hoe No. 8.

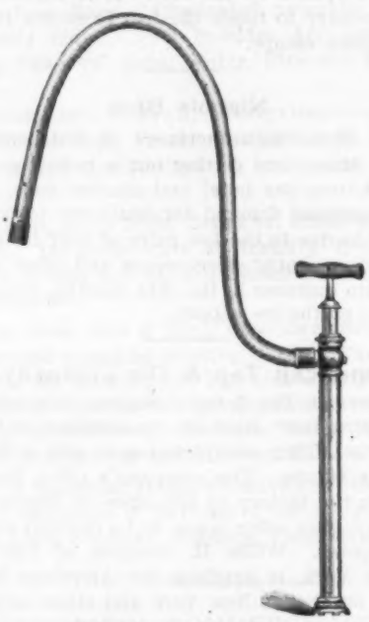
Badger Hay Carrier.

The hay carrier shown herewith is referred to as being unusually strong and well made, with long bearings, while the frame is alluded to as thoroughly braced and of the best malleable iron. The stop or trip lock is attached to two special hanger hooks that fasten to rafter brackets on either side of the rafter, giving, it is stated, great strength at the lifting point, which has the greatest strain. The manufacturers recently tested a short piece of rail with hanger hooks and rafter brackets attached in the same manner as would be the case in a barn, and the rail, we are advised, easily stood a test of 3000 pounds. The carrier is being introduced to the trade by Stowell Mfg. & Foundry Company, South Milwaukee, Wis.

Badger Hay Carrier.

The Johnson Bilge Pump.

The National Mfg. Company of Worcester, Mass., are preparing to put into the sporting goods department of the hardware trade a bilge pump, designed to remove water from any part of a boat displacing the old fashioned method of employing a bailer. The pump, as shown in the accompanying cut, has a barrel 15 inches long and one inch diameter, yet it is able, by means of its double action, to throw a steady stream at the rate of four gallons a minute, which may be increased to six gallons by increased effort on the part of the operator.



The Johnson Bilge Pump.

Dana & Co., Cincinnati, Ohio, advise us that their line of Peerless Iceland ice cream freezers are even of a higher standard than heretofore, as they are seeing to it that the tubs, iron parts, &c., are of the best workmanship they can produce. This year the manufacturers are making more of a feature of their 25 and 40 quart power freezers. It is stated that this is the only power freezer built on the principle of the French pot, which is referred to as being used by all of the best confectioners, who say it makes the finest ice cream.

Perfect Handle Screw Driver.

The H. D. Smith & Co., Plantsville, Conn., have just put on the market the Perfect handle screw driver, here illustrated. As reproduced in Fig. 2 the blade, bolster, handle flat and hammer head are drop-forged from one piece of specially made steel. The wood handles are pocketed in each side of the forging, after having been treated with a water proofing process, then finished in

Fig. 1.—Perfect Handle Screw Driver.

natural (red) color and securely riveted in place in the same way that fine knife handle wrenches are made. This construction permits of the butt end of the handle being used, as is sometimes necessary, to start a screw without detriment to the tool, or, with reasonable care, rusted screws may be loosened for withdrawal by a judicious tap of the hammer on the butt end. The oval shape

Fig. 2.—A One-Piece Steel Forging.

of the handle fits the hand comfortably and gives great leverage. Each tool is carefully tempered and tested, well balanced and fully warranted. The 5-inch size is 9¾ inches over all and weighs 5 ounces. The screwdrivers are made in 4, 5, 6, 7, 8, 10 and 12-inch sizes, the first two having ¼-inch diameters, the following two 5-16-

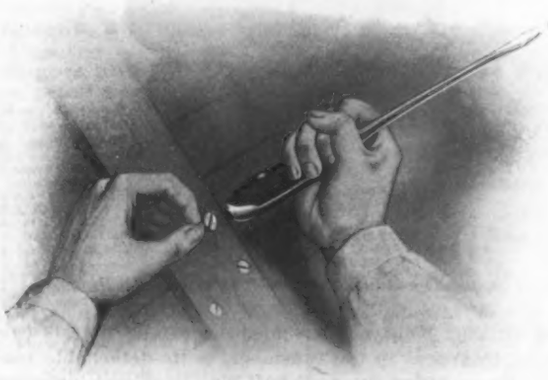


Fig. 3.—Screw Driver Used to Start Screw.

inch, and the remaining three ⅜-inch diameters. They are attractively put up in slide cover wooden boxes containing a half dozen, all sizes to 8-inch inclusive, 12 dozen to a case and the two largest 6 dozen in a case.

Reliable Automatic Door Check.

C. A. Wissel, Dayton, Ohio, is offering the door check shown herewith. The device is secured to the floor by

Reliable Automatic Door Check.

screws, and the door is opened until it comes against the upright portion of the check. The bottom of the door forces down the raised portion of the check, which acts as a door holder and check combined. It is referred to as being easily adjusted and as working entirely automatically.

Ever Ready Plato Clock.

The American Electrical Novelty & Mfg. Company, 304-314 Hudson street, New York, have just added to their large line of electrical novelties, branded "Ever Ready," the Plato clock, here illustrated. The prime characteristic of this clock is that the time is recorded through the medium of leaves, or plates, made from fine quality sheet celluloid, in units of minutes, there being neither hands nor dial, as customary. The hours 1 to 12 are shown above and the minutes as they occur on the lower tier of leaves. The actuating or clock mechanism is compactly placed at the bottom of the case, and the winding and setting by means of thumb screw and lever is accomplished at the same point. There is an ingenious trap of simple mechanism to prevent the plates or leaves from swinging backward. The black figures, about ¾ inch high, show very distinctly against the white background and can be seen at any reasonable distance. The

Ever Ready Plato Clock.

outer dimensions of the clock, regardless of handle, are: Hight, 4⅝ inches; extreme base diameter, 3½ inches, with a glass cylinder inclosing works and the supporting metal columns 2¾ inches across. The metallic parts are all gold finished, but there is a choice in plates of white, red, blue and green. The general appearance of the clock apart from its novelty is pleasing, having been modeled after a French carriage clock. The time is always shown in front, as seen in the cut, hours above and minutes, 1 to 59, inclusive, below.

The Bonney Adjustable Alligator Wrench.

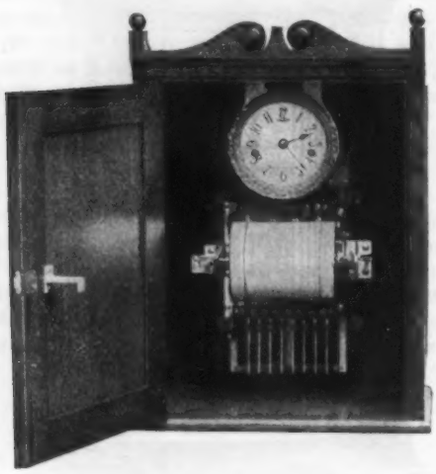
The wrench shown herewith is being put on the market by Kraeuter & Co., 577-579 Eighteenth avenue, Newark, N. J. The jaw is operated by a large knurled worm, which is worked by the thumb without changing the grip. The movable jaw has heavy gears, four teeth of which bear the strain to which the jaw is subjected. The lower, or stationary, jaw is not straight on the inner

The Bonney Adjustable Alligator Wrench.

edge, but is turned off toward the end. This is so made that when the wrench is opened but a little the jaws do not form a long, narrow V, which permits small round pieces to wedge themselves in. By turning the jaw off at the end, it is explained that a wrench of this kind works the same on small pipes as it does on large ones. Among the points of excellence the following are mentioned: That the jaw is operated in a comparatively shorter time than is required to adjust other wrenches; that it is simple, strong and convenient to use. The wrench is made in 6, 8 and 10 inch sizes, all full nickel plated.

Simplex Watchman's Clock.

The distinguishing feature of the recorder shown in the accompanying cut is in the use of a sheet with the time divisions shown by straight vertical lines, the sheet being wrapped about a grooved hard rubber cylinder. The record from each station and the record showing the opening and closing of the door appears in a separate space between horizontal ruled lines. The cylinder is revolved by a Seth Thomas movement through proper gearing, making one revolution in 12 hours, or in 24



The Simplex Watchman's Clock.

hours, as preferred. The record is made by prick pins, which enter the paper from the ruled side of the sheet. The pins are conical and have a squared shoulder at the proper distance from the point. The shoulder strikes the ribs between the grooves of the cylinder, so that continued or rapid turning of the station magnets cannot break the paper or unduly enlarge the perforation. The conical shaped points are to prevent any possibility of sticking or tearing the paper. The pins are hinged directly upon the levers carrying the armatures, and there are no intermediate parts or reversals of motion, direct pull of the magnets forcing the points through the paper. The magnets are mounted in pairs upon two bronze plates, which are easily removable for inspection, leaving all parts readily accessible. The wiring is the same as in other similar systems, using a separate wire to each station and a common return wire from all stations. Either battery or magneto system may be used, but the magneto system is recommended. The illustration represents a station showing the dust and damp proof construction, with cover easily removed without interfering with wires and magnets firmly supported by rigid iron bracket. Among the advantages claimed are the following: That there is a straight ruled sheet, on which a given space represents the same interval of time, whether at top or bottom of sheet; that the 24-hour sheet gives clear record for Saturday night and Sunday, the night man and day man being on different parts of the sheet; that the door record shows the exact time when door was opened or closed, as well as the fact that it was opened or closed; that the sheet is revolved by a clock provided with a dial and hands, insuring more attention to regulation and quicker discovery of trouble in the clock; that the holes are pricked from front side of paper, giving a clear record; that all the parts are easily removed and accessible; that there are no fine adjustments or complicated parts, and that the strong water proof stations are easily open for inspection. The clock is manufactured by the Simplex Recorder Company, Gardner, Mass.

The O-hi-o Detachable Screen Door Hinge.

The hinge shown in the accompanying cuts is a new departure in the style of a screen door hinge. It is made entirely of steel and has the hold open feature, but the

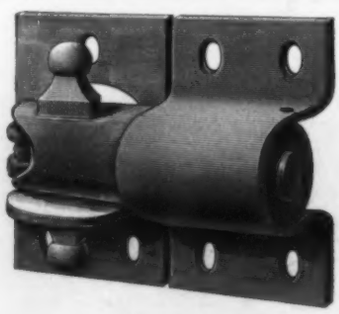


Fig. 1.—The O-hi-o Detachable Screen Door Hinge.

most striking point of convenience and one that is calculated to appeal to the consumer, is its detachable feature. By swinging the door half way back and inserting nail, as shown in Fig. 2, the door can be lifted off and set away, thus avoiding taking out and losing screws.

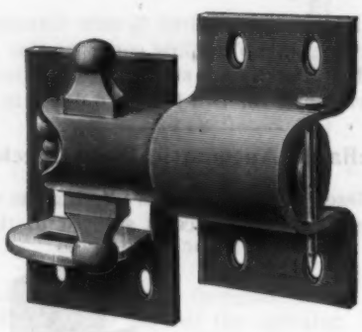


Fig. 2.—To Lift the Door Off.

This hinge is made by the Shelby Spring Hinge Company, Shelby, Ohio, who are also the manufacturers of the Shelby Chief double acting hinge and a general line of hardware specialties.

W. S. Perry has purchased the interest of J. W. Drake in the Perry & Drake Hardware Company, Zanesville, Ohio., and will continue the business at the old stand under his own name.

Current Hardware Prices.

REVISED JANUARY 26, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued June, 1903, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
Crystal ... ℔ ton $90@100
Grain ... ℔ ton $120@140
See also *Emery*.

Adjusters, Blind—

Dom.estic, ℔ doz. $3.00 ... 33⅓%
North's ... 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent ... 35%
Taplin's Perfection ... 35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Armand Hammer, Wrought ℔ lb 8½@8¾¢
Hiel Patent Trenton ... ℔ lb 9½@9¾¢
Eagle Anvils ... ℔ lb 7¼@7¾¢
Hay-Budden, Wrought ... 9@9¼¢
Horseshoe brand, Wrought ... 9@9¼¢

Imported—

Peter Wright & Sons ... ℔ lb 10½¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00 ... 15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co. ... 30&5%

Augers and Bits—

Com. Double Spur ... 70¢10@75%
Boring Machine Augers ... 66⅔@70%
Car Bits, 12-in. twist ... 60@60¢10%
Jennings' Pattern ... 50¢10¢5@60%
Ford's Auger and Car Bits ... 40&5%
Forstner Pat. Auger Bits ... 30%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list 25&10%
No. 30, R. Jennings' List ... 40&7½&10%
Russell Jennings ... 35&10&2½%
L'Hommedieu Car Bits ... 15&10%
Mayhew's Countersink Bits ... 45%
Millers' Falls ... 50&10&7½%
Pugh's Black ... 20%
Pugh's Jennings' Pattern ... 35%
Snell's Auger Bits ... 60%
Snell's Bell Hangers' Bits ... 50&10%
Snell's Car Bits, 12-in. twist ... 60%
Wright's Jennings Bits (R. Jennings' list) ... 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $15; large, $26 ... 50&10%
Clark's Pattern, No. 1, ℔ doz., $26; No. 2, $18 ... 50&10%
Ford's, Clark's Pattern ... 50&10&60%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's ... 60%

Gimlet Bits—

Common Double Cut .. gro. $2.75@3.00
German Pattern ... gro. $4.00@4.25

Hollow Augers—

Bonney Pattern, per doz. $10.00@11.00
Ames ... 25&10%
New Patent ... 25&10%
Universal ... 20%
Wood's Universal ... 25%

Ship Augers and Bits—

Ford's ... 40%
Snell's ... 40%
C. E. Jennings & Co.:
L'Hommedieu's ... 15&10%
Watrous ... 33⅓&10%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled ... gro. $2.75@3.00
Unhandled, Shouldered .gro. 63@66¢
Unhandled, Patent ... gro. 66@70¢
Peg Awls:
Unhandled, Patent ... gro. $1@3¼¢
Unhandled, Shouldered .gro. 65@70¢
Scratch Awls:
Handled, Common .. gro. $3.50@4.00
Handled, Socket .. gro. $11.50@12.00
Hurwood ... 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality, factory brands ... $5.50
First Quality, jobbers' brands ... $5.10@5.25
Second Quality ... $4.50@4.75

Axle Grease—See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar ... 5@5½¢
Concord, Solid Collar ... 5@5½¢
No. 1 Common ... 4@4½¢
No. 1½ Com. New Style ... 4½@5¢
No. 2 Solid Collar ... 4¾@5¼¢
Nos. 7, 8, 11 and 12 ... 60¢5@60¢10%
Nos. 13 to 14 ... 60@5@60¢10%
Nos. 15 to 18 ... 60¢10@70%
Nos. 19 to 23 ... 60¢10@70%

Boxes, Axle—

Common and Concord, not turned .. lb. 4¼@4½¢
Common and Concord, turned ... lb. 5@5½¢
Half Patent ... lb. 9@9½¢

Bait— Fishing—

Hendryx:
A Bait ... 20%
B Bait ... 25%
Competitor Bait ... 20&5%

Balances— Sash—

Caldwell new list ... 50%
Pullman's ... 60%

Spring—

Spring Balances ... 60@60&5%
Chatillon's:
Light Spg. Balances ... 40&10%
Straight Balances ... 40%
Circular Balances ... 50%
Large Dial ... 30%
Petouze ... 50%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb., per lb .. 3@3½¢

Towel—

No. 10 Ideal, Nickel Plate ... ℔ gro, $8.50

Beams, Scale—

Scale Beams, List Jan. 12, '88 .40@10%
Chattillon's No. 1 ... 30%
Chattillon's No. 2 ... 40%

Beaters— Egg—

Lightning Chain, ℔ gro ... $15.00
National Mfg. Co.: ℔ gro.
No. 1 Dover, Family size ... $7.00
No. 2 Dover, Hotel size ... 11.00
Taplin Mfg. Co.: ℔ gro.
No. 60 Improved Dover ... $6.00
No. 75 Improved Dover ... 8.50
No. 100 Improved Dover ... 7.00
No. 102 Improved Dover Tin'd ... 8.50
No. 150 Improved Dover, Hotel ... 15.00
No. 152 Imp'd Dover, Hotel, T'd ... 17.00
No. 200 Imp'd Dover Tumbler ... 8.50
No. 202, Imp'd Dover Tumbler Tin'd 9.50
No. 300, Imp'd Dover Mammoth, ℔ doz ... 25.00
Wonder (S. S. & Co.) ... ℔ gro. net, $6.00

Bellows—

Blacksmith, Standard List .. 75@75&5%

Blacksmiths'—

Net Prices.

Inch..	*30*	*32*	*34*	*36*	*38*	*40*
Each	*$3.50*	*3.75*	*4.25*	*4.80*	*5.35*	*6.15*

Extra Length:
Each .$4.00 4.55 5.10 5.60 6.40 7.50

Molders—

Inch	*10*	*12*	*14*
Doz	*$8.50*	*10.00*	*13.00*

Hand—

Inch	*6*	*7*	*8*	*9*	*10*
Doz	*$4.25*	*4.50*	*5.00*	*6.50*	*7.75*

Bells— Cow—

Ordinary goods ... 75¢5@75¢10%
High grade ... 70¢10@70¢10¢5%
Jersey ... 75&10%
Texas Star ... 50%

Door—

Abbe's Gong ... 45%
Barton Gong ... 55%
Home, R. & E. Mfg. Co.'s ... 55&10%
Lever and Pull, Sargent's ... 60&10&10%
Yankee Gong ... 35%

Hand—

Hand Bells, Polished, Brass ... 60¢ @60¢10%
White Metal ... 60%
Nickel Plated ... 50@5¢5%
Swiss ... 60@60¢7½%
Cone's Globe Hand Bells ... 32½&34½&10%
Silver Chime ... 33⅓&35½&10%

Miscellaneous—

Farm Bells ... lb 2@2½¢
Steel Alloy Church and School ... 60@60¢5%
American Tube & Stamp'g Co. Gongs ... 75%
Table Call Bells ... 5@5&2½%
Trip Gong Bells ... 55&10@60%

Belting— Rubber—

Agricultural (Low Grade) .. 75@75¢5%
Common Standard ... 70@70¢10%
Standard ... 65@70%
Extra ... 60¢5@60¢10%
High Grade ... 50¢5@50¢10%
Boston Belting Co.:
Seamless Stitched Imperial ... 45&5%
Boston ... 50&5%
Niagara ... 60&5%

Leather—

Extra Heavy, Short Lap ... 60@60¢5%
Regular Short Lap 60¢10@60¢10¢10%
Standard ... 70@70¢5%
Light Standard ... 70¢10%
Cut Leather Lacing ... 60¢10%
Leather Lacing Sides, per sq. ft .. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender ... 40%
Green River Tire Benders and Upsetters ... 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain ... 50%
Parts ... 50%
Spokes ... 50%
Tubes ... 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—
See *Augers and Bits.*

Blocks— Tackle—

Common Wooden ... 70¢10@75¢5%
Hollow Steel Blocks, with Ford's Patent Sheaves ... 50&10%
Lane's Patent Automatic Lock and Junior ... 30%
Stowell's Novelty, Mal. Iron ... 50&10%
Stowell's self loading ... 60%
See also *Machines, Hoisting.*

Boards, Stove—

Zinc, Crystal, &c ... 30¢10@40¢10%

Bolts—

Carriage, Machine, &c.—

Common Carriage ... 75¢5@75¢10%
Phila. Eagle, $5.00 list May 24, '99 ... 30@80¢5%
Bolt Ends, list Feb. 14, '95 ... 75¢10%
Machine ... 75¢10@75¢15%
Machine with C & T. Nuts ... 70¢10%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	*3*	*4*	*5*	*6*	*8*
Per doz	*$0.26*	*.30*	*.39*	*.47*	*.65*

Cast Iron Spring Foot:

Inch	*6*	*8*	*10*
Per doz	*$1.00*	*1.25*	*1.75*

Cast Iron Chain, Flat, Japanned:

Inch	*6*	*8*	*10*
Per doz	*$0.75*	*1.05*	*1.30*

Cast Iron Shutter, Brass Knobs:

Inch	*6*	*8*	*10*
Per doz	*$0.57*	*.80*	*1.00*

Wrt Barrel, Jap'd .75¢10@75¢10¢10%
Wrought " Bronzed .50¢5@50¢10%
Wrought Flush, B. K. .50¢10@50¢10%
Wrought Shutter .. 40¢10¢10@60¢5%
Wrought Square Neck ... 50@50¢10%
Wrought Sunk, Flush ... 50@50¢10%
Ives' Patent Door ... 60%

Stove and Plow—

Plow ... 60@60¢5%
Stove ... 30@30¢10%

Tire—

Common ... 72½@72½¢10%
Norway Iron ... 80@80¢5%
American Screw Company:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila. list Oct. 16, '84 ... 82½%
Bay State, list Dec. 28, '99 ... 72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila., list Oct. 16, '84 ... 82½%
Eclipse, list Dec. 28, '99 ... 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 ... 72½%
Norway Phila., list Oct. '84 ... 80%
Upson Nut Co.:
Tire Bolts ... 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	*1¼*	*1½*	*1¾*	*2*
Per doz	*$4.50*	*5.00*	*5.75*	*7.25*
Inch			*2¼*	*2½*
Per Doz			*$8.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each ... 25%

Boxes, Mitre—

C. E. Jennings & Co. ... 25&10%
Langdon ... 15&10%
Perfection ... ℔ doz. $6.00
Schatz ... 40%

Braces—

NOTE.—*Most Braces are sold at net prices.*
Common Ball, American .. $1.15@1.25
Barber's ... 50&10&10¢60&10%
Fray's Genuine Spofford ... 60%
Fray's No. 70 to 120, 81 to 133, 207 to 414 ... 60%
C. E. Jennings & Co. ... 50&5&10%
Mayhew's Ratchet ... 60%
Mayhew's Quick Action Hay Patent .. 50%
Millers Falls Drill Braces ... 25&10%
P. S. & W. Co. Peck's Patent 60&10¢65%

Brackets—

Wrought Steel ... 80@80¢5%
Bradley's Wire Shelf:
Full cases ... 80&10&10%
Broken cases ... 80&10%
Griffin's Pressed Steel ... 80%
Griffin's Folding Brackets ... 70&10%
Stowell's Cast Shelf ... 75%
Stowell's Sink ... 50%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Wire Goods Co. ... 75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks Saw—

Hoosier ... ℔ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts— Brass—

Wrought list Sept., '96 ... 30@30¢5%
Cast Brass, Tiebout's ... 50%

Cast Iron—

Fast Joint, Broad ... 60@50¢10%
Fast Joint, Narrow ... 50@50¢10%
Loose Joint ... 70¢5@70¢10%
Loose Pin ... 70¢5@70¢10%
Mayer's Hinges ... 70&5@70¢10%
Parliament Butts ... 70¢5@70¢10%

Wrought Steel—

Table and Back Flaps ... 75%
Narrow and Broad ... 75%
Inside Blind ... 75¢10%
Loose Pin ... 75%
Loose Pin, Ball and Steeple Tip ... 90¢20%
Japanned, Ball Tip Butts .70¢1%
Bronzed Wrt. Nar. and Inside Blind Butts ... 55¢10%

Extra 10@10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series ... 5%
1200 series ... 33⅓%
200, 300, 600 and 900 series ... 40&10%
Hendryx Bronze:
700, 800 series ... 40&10%
Hendryx Enameled ... 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong ... per lb. 4@4¼¢
Sharp, 1 prong ... per lb. 4¼@4¾¢
Perkins' Blunt Toe ... cents, ℔ lb .385
Perkins' Sharp Toe ... cents, ℔ lb .415

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 50	2.00	2.25	each.
Iowa Pattern...	....	2.35	2.50	each.
	20	30	40	qts.
New York Patt'rn	1.65	2.40	2.75	each
Baltimore Patt'rn	....	1.80	2.00	each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	64.20	129.60 gro., net

Caps—Percussion—

Eley's E. B......*60c*
G. D......*per M 34@35c*
F. L......*per M 40@45c*
G. E......*per M 50@52c*
Musket.....*per M 62@63c*

Primers—

Berdan Primers, $2.00 per M...20@25%
B. L. Caps (Startevant Shells) $2.00 per M.....*20%*
All other primers per M. $1.52@$1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....*10c&5%*
38 C. F., $7.00.....*10c&5%*
22 cal. Rim, $1 50.....*10c&5%*
32 cal. Rim, $2.75.....*10c&5%*
B. B. Caps, Con. Ball Swgd.....*$1 90*
B. B. Caps, Round Ball.....*$1.40*
Central Fire.....*25%*
Target and Sporting Rifle.....*15c&5%*
Primed Shells and Bullets.....*15c&10%*
Rim Fire Sporting.....*50%*
Rim Fire, Military.....*15c&5%*

Cases, Show—

Sun, No. 102, Silent Salesman, 6 ft., $25.00

Casters—

Bed.....*70@70c&10%*
Plate.....*60@60c&5%*
Philadelphia.....*75@75c&10%*
Boss.....70&10%
Boss Anti-Friction.....70&10%
Martin's Patent (Phoenix).....45%
Smith & Hemenway Co.....33⅓&5%
Standard Ball Bearing.....45%
Tucker's Patent low list.....80%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	¼	5-16	⅜	7-16	½	9-16
8.50	5.50	4.40	4.00	3.80	3.70	3.65
⅝	¾	⅞	1 to 1¼ inch.			
3.60	3.55	3.50	3.40	per 100 lb.		

German Coil.....*60&10c&10%*

Halters and Ties—

Halter Chains.....*60c&10@60c&10c&10%*
German Halter Chains, list July 24, '97.....*60&10&10@70c&10%*
Cow Ties.....*60@60c&10%*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-3, Straight, with ring..*$26.00*
6½—6-2, Straight, with ring..*$26.50*
6½—8-2, Straight, with ring..*$30.00*
6½—10-2, Straight, with ring..*$35.00*
Add 2c per pair for Hooks.
Twist Traces 2c per pair higher than Straight Link.
Trace, Wagon and Fancy Chains..*60@60c&10%*

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....*60c&10@60c&10c&10%*
Brass.....*60c&10@60c&10c&10%*
Safety Chain.....*70&10@75c&5%*
Gal. Pump Chain.....*lb 14½c*
Covert Mfg. Co.
Breast.....40&2%
Halter.....40&2%
Heel.....40&2%
Rein.....40&2%
Stallion.....40&2%
Covert Sad. Works:
Breast.....70%
Halter.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Eureka Coil and Halter.....45@50&5%
Niagara Coil and Halter.....45@50&5%
Niagara Cow Ties.....45&5@50&10&5%
Niagara Wire Dog Chains.....45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl-Jointed Chain.....50%

Chalk—(From Jobbers.)

Carpenters' Blue.....*gro. 40c*
Carpenters', Red.....*gro. 35c*
Carpenters', White.....*gro. 30c*
See also Crayons.

Checks, Door—

Bardsley's.....45%
Columbia.....50&10%
Eclipse.....60&10%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemens' Chests, with Tools.....30%
Farmers', Carpenters', etc, Chests, with Tools.....30%
Machinists' and Fitters' Chests, Empty.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—Socket Framing and Firmer

Standard List.....*70@70c&10%*
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60&10%
C. E. Jennings & Co. Socket Framing No. 15.....60&10%
Swan's.....70%
L. & I. J. White.....30@30&5%

Tanged—

Tanged Firmers.....*40c&5@40&10%*
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181.....16⅔&10%
L. & I. J. White, Tanged.....35&5%

Cold—

Cold Chisels, good quality.lb. 13@15c
Cold Chisels, fair quality..lb. 11@12c
Cold Chisels, ordinary.....lb. 9 @10c

Chucks—

Beach Pat., each $8.00.....35&5%
Pratt's Positive Drive.....25%
Empire.....25%
Blacksmiths'.....25%
Skinner Patent Chucks:
Combination Lathe Chucks.....40%
Drill Chucks, Patent and Standard...30%
Drill Chucks, New Model.....20%
Independent Lathe Chucks.....40%
Improved Planer Chucks.....25%
Universal Lathe Chucks.....40%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron Face Plate Jaws..40%
Independent Steel Face Plate Jaws..40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....40%
Little Giant Double Grip Drill.....40%
Little Giant Drill, Improved.....40%
Oneida Drill.....40%
Scroll Combination Lathe.....40%

Clamps—

Adjustable, Hammers'.....20@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P., S. & W. Co.....50%
Carriage Makers' Sargent's.....60%
Beaver Parallel.....33⅓&10%
Linemans' Utica Drop Forge & Tool Co40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners, Drain—

Iwan's Champion, Adjustable.....35%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel.....₩ doz. $4.05 net
Star Shank, All Steel.....₩ doz. $3.24 net
W. & C. Snare, All steel, ₩ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓&33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....$10.75 }
20th Century Horse, each, $5.00.....30%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep.....$18.50 }

Finger Nail Clippers—

Smith & Hemenway Co.....doz. net $2.00

Clips, Axle—

Eagle and Superior ¼ and 5-16 inch.....*70c&10%*
Norway, ¼ and 5-16 inch..*70@70c&10%*

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression and Plain Bibbs.....*65c&10@70%*
Globe, Kerosene, Racking, &c.. Cocks.....*65c&5@70c&5%*

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Walter B. Stevens & Son's list.40%
Embossed, Gilt, Walter B. Stevens & Son's list.....30&10%
Leather, Walter B. Stevens & Son's list40%

Combs, Curry—

Metal Stamping Co.....30&10%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses Dividers, &c.

Ordinary Goods.....*75c&5@75c&10%*
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%

Compressors, Corn Shock—

J. B. Hughes' ₩ doz.....$2.50

Conductor Pipe, Caiva.—*L. C. L. to Dealers:*

Territory.	*Nested.*	*Not nested.*
A. Eastern.	*75c&7½&5*	*75c&2½&5*
B. Eastern	*75c&10&2½&5*	*75c&7½&5*
Central.....	*75c&7½&5*	*75&5*
Southern ..	*70c&10%*	*70c&5%*
S. Western..	*70c&7½&5*	*70c&2½&5*

Terms, 60 days, 2% cash, 10 days. Factory shipments generally delivered.
See also *Eave Troughs.*

Coolers, Water—

Gal. each.	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	2.70
Gal.	3		4	6	8
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galv. Lined Ea.	$1.85	$2.00	$2.2	$2.90	$3.90

25%

Ga.v. Lined side handles

Gal.	2	3	4	6	8
Each.	$1.95	$2.15	$2.40	$3.30	$4.15..25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab.....*lb. 27@28c*
Braided, White, Com.....*lb. 21@23c*
Cable Laid Italian..lb. A, 18c; B, 16c
Common India.....*lb. 10@10½c*
Cotton Sash Cord, Twisted....*15@20c*
Patent Russia.....*lb. ..@14c*
Cable Laid Russia.....*lb. ..@15c*
India Hemp, Braided.....*lb ..@18c*
India Hemp, Twisted.....*lb. 12@13c*
Patent India, Twisted.....*lb.12@13c*

Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12.....₩ lb 26 ¢
Anniston, Nos. 7 to 12.....₩ lb 21 ¢
Old Colony, Nos. 7 to 12.....₩ lb 21 ¢
Anniston Drab, Nos. to 12.....₩ lb 26 ¢
Pearl Braided, cotton, No. 6₩ lb, 22¢; Nos. 7 to 12 21¢.
Eddystone Braided Cotton.....₩ lb 19¢
Harmony Cable Laid Italian.....₩ lb 18¢
Peerless:
Cable Laid Italian.....16¢
Cable Laid Russian.....14¢
Cable Laid India.....12¢
Braided India.....18¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton.....₩ lb 36½¢
Braided, Italian Hemp.....₩ lb 36¢
Braided, Linen.....₩ lb 53¢
Braided, White Cotton or Spot.₩ lb 33¢
Massachusetts, White.....₩ lb 28 ¢
Massachusetts, Drab.....₩ lb 32 ¢
Phœnix, White, No's 7 to 12.....24¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab, 40¢.....15%
A quality, White, 35¢.....15%
B quality, Drab, 35¢.....15%
B quality, White, 30¢.....15%
Italian Hemp, 40¢.....15%
Linen, 57½¢.....15%

Wire, Picture—

List Oct., '00.....*85c&10@85c&10c&10%*

Cradles—

Grain.....*40c&12½&5*

Crayons—

White Round Crayons, gross.5½@6c Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons.gr. $2.50
Soapstone Pencils, round, flat or square.....gr.$1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots 20%
See also *Chalk.*

Crooks, Shepherds'—

Fort Madison, Heavy.....₩ doz. $7.00
Fort Madison, Light.....₩ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847..₩ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₩ doz. $3.00
Wm. Rogers & Son.....₩ doz. $2 50
Simeon L. & Geo. H. Rogers Company:
12 dwt. Medium Knives.....₩doz. $3.00
No. 77 Medium Knives.....₩ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....25@25&7½&5

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's, ₩ doz.....30c10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant, ₩ doz.....33⅓@40%

Nos.	305	310	312	340	332
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....40%
New Triumph No. 605, ₩ doz. $24.00.....30&10&10%
Russwin Food No. 1, $24 00; No. 2, $27.00.....45&10&10%
Sterling.....40@40&10%
No 1....$2.00 each No. 2 . $2.50 each
Woodruff's, ₩ doz.....30&10@40%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9.55%
Kraut Cutters 36 x 12, 40 x 12.....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....₩ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₩ doz. $4.00
Sterling, $6.00 each.....33⅓%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife, ₩ gr....$18@$20
Slaw Cutters, 2 Knife, ₩ gr....$22@$30

Tobacco—

All Iron, Cheap.....*doz. $1.25@$1.50*
Enterprise.....35&20%
National, ₩ doz. No. 1, $21; No. 2, $18..40%
Sargent's, ₩ doz., No. 2.....60%
Sargent's No 12 and 21.....60&10%

Washer—

Appleton's, ₩ doz. $16.00.....50&10&10%
Bonney's.....33⅓%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz., $9.00
Iwan's Improved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers, ₩ doz.....$6.50
Iwan's Perfection Post Hole Digger.....₩ doz. $8.50
Iwan's Split Handle Post Hole Diggers, ₩ doz.....$7.50
Kohler's Universal.....₩ doz. $15.00
Kohler's Little Giant.....₩ doz. $12.60
Kohler's Hercules.....₩ doz. $10.00
Kohler's Invincible.....₩ doz. $9 60
Kohler's Rival.....₩ doz. $8.50
Kohler's Pioneer.....₩ doz. $7.50
Never-Break Post Hole Diggers, ₩ doz. $24.00.....60%
Samson, ₩ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ¼ in.....₩ doz, $10.50
Phillips', style 077, ⅜ in. .....₩ doz, $8.00
Phillips', style x-y, ⅜ in. .....₩ doz, $11.00
Porter's Plain, No. 6.....₩ doz. $6 75
Porter's Ornamental, No. 70. ₩ doz. $10.50
Porter's No. 99.....$9.00
Porter's No. 44.....$10.75

Drawers, Money—

Sun Money Drawers, No. 5, ₩ doz. $9.50; No. 5, with Bell, $10.00; No. 6, with Gong, $10.50.
Tucker's Pat. Alarm Till No. 1, ₩ doz. $18; No. 2, $15; No. 3, $12; No. 4, $18

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3.....16⅔&10%
Johnson's Drill Points.....16⅔&5&10%
Millers Falls Automatic Drills...33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....33⅓%
Ratchet, Whitney's, P. S. & W.....50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....*5c&10@60c&10c&10%*
Taper and Straight Shank.....*60c&10@60c&10c&5%*

Drivers, Screw—

Screw Driver Bits..per doz. ..45@75c
Balsey's Screw Holder and Driver, ₩ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9..40%
Buck Bros' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet.....35%
Goodell's Auto50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....50%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21.....25&10%
Millers Falls, Nos. 11, 12, 41 ,42.....15&10%
Never Turn.....60%
New England Specialty Co.....50%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles30@60&10&10%
No. 86.....70@70&10&10%
Swan's:
Nos. 65 to 68.....50%
No. 40.....40&10%
Nos. 25, 35 and 45.....20&10&10%

Eave Trough, Galvanized

Territory.	*L. C. L.*
A. Eastern.....	*80c&10%*
B. Eastern.....	*80c&10c&5%*
Central.....	*80c&10%*
Southern.....	*75c&16⅔&5%*
S. Western.....	*75c&10c&5%*

Terms, 2% for cash. Factory shipments generally delivered.
See also *Conductor Pipe and Elbows.*

Elbows and Shoes—

Factory shipments.....*60%*
Perfect Elbows (b. S. & Co.).....30%

Emery, Turkish—

	4to5	5½to15	Flour
Kegs.....	*lb. 5c*	*5½c*	*3½c*
½ Kegs.....	*lb. 5½c*	*5¾c*	*3¾c*
Kegs.....	*lb 5c*	*6c*	
10-lb cans. 10 in case	*6½c*	*7c*	*6c*
10-lb. cans, less than 10.	*10c*	*8c*	

NOTE.—*In lots 1 to 3 tons a discount of 10% is given.*

Extractors, Lemon Juice

Fasteners, Blind—See *Squeezers, Lemon.*

Zimmerman's.....50&10%
Walling's.....50%

Cord and Weight—

Ives.....40%

Faucets—

Cork Lined.....*50@50c&10%*
*Metallic Key, Leather Lind*70@70c&10%
Red Cedar.....*40@40c&10%*
Petroleum.....*70c&10@75%*
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key.... 40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Metal Key.50&10%
John Sommer's Duplex Metal Key....60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined 50&10%
John Sommer's Chicago Cork Lined..60%
John Sommer's O. K. Cork Lined.....50%
John Sommer's No Brand, Cedar.....50%
John Sommer's Perfection Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....35%
Improved, ¼ and ⅜ inch.....25%
Self Measuring:
Enterprise, ₩ doz. $30.00..... .40&10%
Lane's, ₩ doz. $36.00.....40&10%
National Measuring, ₩ doz. $36..40&10%

Felloe Plates—See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands.....*70c&5@70c&10c&5%*
Standard Brands..*75c&5@75c&10c&10%*
Second Quality.....*75c&10c&10@80c&5%*

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....*30%*

Fixtures, Grindstone—

Net Prices:

Inch....	*15*	*17*	*19*	*21*	*24*
Per doz.	*$3.75*	*3.85*	*3.25*	*5.75*	*4.50*

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's.....60&10&10%
Stowell's Giant Grindstone Hanger.... ₩ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures Light... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1. 1899, list;
Hay, 2 tine ..... 50¢10¢5%
Boys'. & Fish, 2 tine ..... 50¢10¢5%
Hay & Boys', 3 tine ..... 60¢5%
Hay & Boys', 4 tine 66⅔%
Champion Hay 66⅔%
Hay & Header, long 3 tine 65%
Header. 4 tine 65%
Barley, 4 & 5 tine, Steel ..... 60¢20%
Manure, 4 tine ..... 60¢15¢2½%
Manure, 5 and 6 tine ..... 66⅔¢2½%
Spading ..... 70¢2½%
Potato Digger, 6 tine ..... 60¢10%
Sugar Beet ..... 40¢10%
Coke & Coal ..... 60¢10%
Heavy Mill & Street 65%
Iowa Dig-Ezy Potato 65%
Victor Hay ..... 60¢5%
Victor. Manure 66⅔%
Victor, Header 66⅔%
Champion, Hay 66⅔%
Champion, Manure ..... 60¢20%
Columbia, Hay ..... 66⅔¢5%
Columbia, Manure 70%
Columbia Spading ..... 70¢10%
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine $6.00.
W. & C. Potato Digger ..... 60¢12½%
Acme Hay ..... 60¢10¢5%
Acme Manure, 4 tine ..... 60¢20¢7½%
Dakota Header ..... 65¢15¢5%
Jackson Steel Barley ..... 65¢15¢5%
Kansas Header 66⅔%
W. & C. Favorite Wood Barley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons.*

Fountains, Stock—

Double Dewey ..... ₱ doz. $13.00

Frames— Saw—

White, Straight Bar, per doz. 75@80c
Red, Straight Bar, per doz $1.00@$1.25
Red, Double Brace, per doz. $1.40@1.50

Freezers Ice Cream—

Qts...	*3*	*3*	*4*	*6*	*8*	*10*
Best	*$1.45*	*1.65*	*1.95*	*2.40*	*3.20*	*4.00*
Good	*$1 25*	*1.40*	*1.60*	*2.00*	*2.70*	*3.60*
Fair	*$1.00*	*1.10*	*1.30*	*1.75*	*2.30*	*2.90*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—

Per 1000 Feet.
Hemp Fuse *$2.60*
Cotton Fuse *2.90*
Single Taped Fuse *3.25*
Double Taped Fuse *4.20*
Triple Taped Fuse *5.00*
} 10¢2½%

Gates, Molasses and Oil—

Stebbins' Pattern....30¢5@80¢10¢5%

Gauges—

Marking, Mortise, &c. ..... *50¢10¢5@50¢10¢10¢5%*
Chapin-Stephens Co.:
Marking, Mortise, etc. 50&10@50&10&10%
Scholl's Patent ..... 50&10@50&10&10%
Door Hangers ..... 50@50&10%
Fulton's Butt Gauge ..... 30&10%
Stanley R. & L. Co.'s Butt & Babbet Gauge ..... 20@20&10&10%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire P., S. & W. Co ..... 30&10%

Gimlets— Single Cut—

Nail, Metal, Assorted, gro. $1.40@1.50
Spike, Metal, Assorted gro. $2.30@3.50
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $4.25@4.50

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co ..... 60@60&10&10%

Glue—Liquid Fish—

Bottles or Cans, with Brush....25@50%
Cans (½ pts., pts., qts., ½ gal., gal.) ..... *25@48%*
International Glue Co. (Martin's) ..... 40¢10@50%

Grease, Axle—

Common Grade ..... *gro. $4.50@5.50*
Dixon's Everlasting....10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs., ₱ doz. 1 lb $1.20; 2 lb $2.00

Grips, Nipple—

Perfect Nipple Grips ..... 40¢10&2%

Griddles, Soapstone—

Pike Mfg. Co ..... 33⅓&33⅓&10%

Grindstones—

Bicycle Emery Grinder $6.50
Bicycle Grindstones, each ..... $2.50@3.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz. $2.00
Pike Mower Knife and Tool Grinder, each $6.00
} 33⅓%
Velox Ball Bearing, mounted, Angle Iron Frames ..... each, $3.25

Halters and Ties—

Covert Mfg. Co.:
Web ..... 45&2%
Jute Rope ..... 40&5&5%
Sisal Rope ..... 30&2%
Covert's Saddlery Works:
Web and Leather Halters 70%
Jute and Manila Rope Halters 70%
Sisal Rope Halters ..... 60&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties ..... 60&10%

Hammers—Handled Hammers—

Heller's Machinists' ..... 40&10@40&10&10%
Heller's Farriers ..... 40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 40@40&10&10%
Peck, Stow & Wilcox ..... 40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail ..... 33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand ..... 50&7½&5@50&10&7½&5%
Machinists' Hammers ..... 50&5@50&10&5%
Riveting and Tinners' ..... 40&2½@40&10&2½%
Sargent's C. S. New List 40%

Heavy Hammers and Sledges—

Under 3 lb.....lb 50c
3 to 5 lb.....lb. 40c } 75¢10@80
Over 5 lb.....lb. 30c } ¢10%
Wilkinson's Smiths'.....9½c@10c lb.

Handles—

Agricultural Tool Handles—

Axe, Pick, &c. ..... *45@50¢5%*
Hoe, Rake, &c. ..... *45@50¢5%*
Fork, Shovel, Spade, &c.:
Long Handles ..... *45@50&5%*
D Handles *40%*

Cross-Cut Saw Handles—

Atkins' ..... 40&5%
Champion ..... 45@45&10%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted.....gro. $2.50@$2.75
Brad Awl ..... *gro. $1.65@$1.85*
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.40@$2.65
Hickory Tanged Firmer, gro. ass'd. $2.15@$2.40
Apple Socket Firmer, gro. ass'd, $1.75@$1.95
Hickory Socket Firmer, gro. ass'd. $1.45 @ $1.60
Hickory Socket Framing, gro. ass'd. $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, Axe, &c. *50%*
Hand Saw, Varnished, doz .30@85c
Not Varnished.....65@75c
Plane Handles:
Jack, doz. 30c; Jack Bolted.....75c
Fore, doz.....45c; Fore, Bolted.. 90c
Chapin-Stephens Co.:
Carving Tool ..... 40@40&10%
Chisel ..... 65@65&10%
File and Awl ..... 65@65&10%
Saw and Plane ..... 40@40&10%
Screw Driver ..... 40@40&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle, ₱ gro ..... $0.85@$1.30

Hangers—

Barn Door, New Pattern, Round Groove, Regular:

Inch	*3*	*4*	*5*	*6*	*8*
Single Doz.	*$0.90*	*1.25*	*1.60*	*1.95*	*2.50*

Barn Door, New England Pattern, Check Back, Regular:

Inch	*3*	*4*	*5*	*6*
Single Doz.	*$1.30*	*1.85*	*2.50*	*3.00*

Allith Mfg. Co.
Reliable No. 1 ..... per doz. $12.00
Reliable No. 2 ..... per doz. $15.00
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carriar Mfg. Co.:
Loose Axle 60%
Roller Bearing ..... 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing $4.15
Parlor, Standard $3.35
Parlor, New Model $2.85
Parlor New Champion $2.25
Barn Door, Standard. 50&10&10&5%
Hinged $6.40
Covered ..... 50&10&10%
Special ..... 50&10&10&5%
Lawrence Bros.:
Advance 60%
Cleveland ..... 60&10%
Crown 60%
Giant ..... 50&10%
New York 60%
Peerless ..... 60&10%
Sterling 60%
Swing, No. 95 ..... 60%
Union, No. 44, $5.00; No. 45 $7.00; No. 46, $9.00 ..... 60%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Hinged Hangers, $16 ..... 50%
Meyers' Stayon Hangers 60%
C. S. Smith Mfg. Co.:
Lundy Parlor Door ..... 50&10%
Monarch Barn Door ..... 60&10%
Never Jump Hinge ..... 50&10%
Peerless ..... 60&10%
Perfection ..... 70&5%
Phoenix ..... 70&5%
Wagner's Adjustable ..... 70&10%
Warehouse Anti-Friction 60%
Richards Mfg. Co.:
Pioneer Wood Track No. 8 ..... $2.25
Imp'd Wood Track No. 5 ..... $2.25
Imp'd Steel Track No. 7 ..... $2.70
Imp'd Steel Track No. 7 ..... $2.65
Ball B'r'g Steel Track No. 9 ..... $2.50
Ball B'r'g Steel Track No. 10 ..... $2.50
Roller B'r'g Steel Track No. 11 ..... $2.45
Roller B'r'g Steel Track No. 12 ..... $2.40
Ball B'r'g Steel Track No. 13 ..... $2.75
Roller B'r'g Steel Track No. 14 ..... $2 65
Ball B'r'g Trolley Track No. 15 ..... 40%
Ball Brg Trolley Track No. 19 ..... 40&5%
Ball Bearing Tandem Trolley Track No. 16 ..... 40%
Silent Adjustable Track No. 18 ..... 40%
Auto Adjustable Track No. 22 ..... 40%
Trolley B. D. No. 17 ..... $1.60
Trolley F. D. No. 120 ..... $2.70
Trolley F. D. No. 121 ..... $2.35
Trolley F. D. No. 151 ..... $3.00
Roller Bearing D. D. No. 25 ..... 70&5
Roller Bearing U. S. B. D. ..... 70&5%
Anti Friction B. D. ..... 60&10%
Ives' Wood Track No. 1 ..... $2.15
Ives' Imp'd Wood Track No. 2 ..... $2.15
Stowell Mfg. and Foundry Co.
Acme Parlor Ball Bearing 40%
Ajax Hinge Door 60%
Apex Parlor Door ..... 50&10&5%
Atlas 60%
Baggage Car Door 50%
Climax Anti-Friction ..... 50&10%
Elevator 40%
Express 50%
Freight Car Door 60%
Interstate ..... 40&10%
Lundy Parlor Door ..... 50&10%
Magic 60%
Matchless ..... 60&10%
Nansen ..... 70&5%
Parlor Door ..... 50&10%
Railroad ..... 50&10%
Rex Hinge Door 60%
Street Car Door 50%
Steel, Nos. 300, 404, 500 ..... 50&10%
Underwriter's Fire Door 40%
Wild West Warehouse Door 50%
Zenith for Wood Track ..... 50&10%
A. L. Swett Iron Works:
Eagle ..... 60&10%
Hylo ..... 50&10%
Perfection 60%
Pilot 60%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing ..... 50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing ..... 60&10%
C. J. Roller Bearing ..... 60&10%
Cycle Ball Bearing 50%
Dwarf Ball Bearing 40%
Ives, Wood Track ..... 60&10%
L.T. Roller Bearing ..... 60&10&5%
New Era Roller Bearing ..... 50&10%
O. K. Roller Bearing ..... 60&10&5%
Prindle, Wood Track 60%
Richards' Wood Track 60%
Richards' Steel Track ..... 50&10%
Spencer Roller Bearing ..... 60&10%
Tandem Nos. 1 and 2 ..... 60%
Underwriters' Roller Bearing 40%
Velvet 50%
Wilcox Auditorium Ball Bearing 20%
Wilcox Barn Trolley No. 123 ..... 40%
Wilcox Elv. Door, Nos 112 and 122½ 50%
Wilcox Elv. Door, No. 132 ..... 40%
Wilcox Fire Trolley, Roller Bearing 30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century ..... 50&10&10%
Wilcox O. K. Steel Track 50%
Wilcox O. K. Trolley 50%
Wilcox Trolley Ball Bearing 40%
Wilcox Wideman Narrow Gauge, Ball Bearing 40%
For Track, see *Rail.*

Extra 5@10% often given.

Hangers, Gate—

Myers' Patent Gate Hangers, ₱ doz net 4.80

Hasps—

McKinney's Perfect Hasp, ₱ doz 50%

Hatchets—

Best Brands ..... *50@50¢10%*
Cheaper Brands ..... *60@60¢10%*
Note.—Net prices often made.

Heaters, Carriage—

Clark, No. 8, $2.25; No. 3D, $2.75; No 8x, $4.25; No. 1, $4.50 each 15%
Clark Coal, $0.75 ₱ doz 10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P. Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.85*	*1.75*	*3.50*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1¼*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter, (Buffalo, &c.)

No.	*1*	*1¼*	*2*
Doz. pair	*$0.75*	*.70*	*.65*

North's Automatic Blind Fixtures, No. 3, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Parker ..... 70@75%
Reading's Gravity ..... 50&5%
Sargent's, Nos. 1, 3, 5, 11 & 13 ..... 70&10&75%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter ..... 7 &5%
Acme Lull & Porter 75%
Queen City Reversible 75%
Stenger's Positive Locking, Nos. 1 & 3 ..... 70&10%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75%
1868, Old Pat'n, Nos. 1, 3 & 5 ..... 75%
Tip Pat'n, Nos. 1, 3& 5 ..... 75%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 75%
Shepard's Double Locking, Nos. 20 & 25 ..... 70%
Champion Gravity Locking, No. 75..75%
Steamboat Gravity Locking, No. 10. 75%
Pioneer, Nos. 080, 45 & 5½ 75%
Empire, Nos. 101 & 103 ..... 70%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60%
Whipple's Patent Automatic 30%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with Latches	*$3.00*	*3.70*	*5.00*
Hinges only	*$1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....doz .....@$2.00
Without Latch .....doz. .....@$1.60
Reversible Self-Closing:
With Latch.....doz. .....@$1.75
Without Latch.....doz. .....@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville H'dware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Spring Hinges—

Holdback, Cast Iron gro. $9.00@10.00
Non-Holdback, Cast iron.....
gro. $8.00@9.00

Extra 5@10% often given.

J. Bardsley
Bardsley's Non-Checking Mortise Floor Hinges 45%
Bardsley's Patent Checking 15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges 40%
Bommer Spring Hinges 40%
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor Hinge 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hdw. Co.:
Acme, Wrt. Steel 30%
Acme, Brass 25%
American 30%
Columbia, No. 14 ..... ₱ gr. $9.00
Columbia, No. 18 ..... ₱ gr. $25.00
Columbia, Adjustable, No. 7 ₱ gr. $12.00
Gem, new list 30%
Clover Leaf ..... ₱ gr. $12.50
Oxford, new list 30%
Lawson Mfg. Co.:
Matchless 35%
Matchless Pivot 45%
Shelby Spring Hinge Co.:
Crown Jamb Hinge 40%
Chief Ball Bearing Floor Hinge. 45%
Royal Ball Bearing Floor Hinge. 45%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr $12.50
Ideal, No. 4 ..... ₱ gr. $9.00
New Idea No. 1 ..... ₱ gr. $9.00
New Idea, Double Acting 35%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges ..... *80¢5%*
Heavy Strap Hinges *80¢20¢10%*
Light T Hinges ..... *75¢10¢5%*
Heavy T Hinges ..... *75¢5%*
Extra Heavy T Hinges ..... *80¢2%*
Hinge Hasps *70%*
Cor. Heavy Strap ..... *80¢20¢10%*
Cor. Ex. Heavy T ..... *80¢20*
} Ex 10¢10¢10%

Screw Hook and Strap. { *6 to 12 in.* ..... *lb. 3½c* / *12 to 20 in* ..... *lb. 3 c* / *22 to 36 in* ..... *lb. 2¾c*
Screw Hook and Eye:
¾ to 1 inch ..... *lb. 6 c*
⅝ inch ..... *lb. 7 c*
½ inch ..... *lb. 9 c*

Hitchers, Stall—

Covert Mfg. Co,. Stall Hitchers. 35%

Hods, Coal—

	15	*16*	*17*	*18 inch.*
Galv. Open	*$2.50*	*2.75*	*3.00*	*3.25* ₱ doz.
Jap. Open	*$2.00*	*2.25*	*2.50*	*2.75* ₱ doz.
Galv. Fun'el	*$3.00*	*3.25*	*3.50*	*3.75* ₱ doz.
Jap. Funnel	*$2.50*	*2.75*	*3.00*	*3.25* ₱ doz.

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar ..... each $1.45
Steel Brick ..... each $1.10

Hoes— Eye—

Scovil and Oval Pattern, ... *60¢10@60¢10¢10%*
Grub, list Feb. 23, 1899. ..... *60¢10¢10@70%*
D. & H. Scovil 35%

Handled—

Aug. 1, 1899, List:
Field and Garden ..... *70¢10%*
Smith's Patent *50%*
Meadow & Rhode Island *75%*
Black Diamond ..... *70¢10%*
Mortar and Street ..... *70¢10¢10%*
Planters' ..... *75¢12½%*
Cotton ..... *70¢10¢10%*
Cotton Chopper ..... *75¢12½%*
Weeding Hoes ..... *66⅔¢15%*
Steel Weeders ..... *66⅔¢15%*
Malleable Weeders ..... *66⅔¢15%*
Ft. Madison Cotton Hoe ..... 75&7½%
Ft. Madison Crescent Cultivator Hoe per doz ..... 75¢10%
Ft. Madison Mattock Hoes:
Regular Weight ..... ₱ doz. $5.00
Junior Size ..... ₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4 60
Ft. Madison Dixie Tobacco Hoe. 75&20%
Kretsinger's Cut Easy ..... 70&10%
Warren Hoe 50%
W. & C. Ivanhoe ..... 75&2%
B. B. 6 in., Cultivator Hoe $3.15
B. B., 6¼ in $3.35
Acme Weeding ..... ₱ doz., net $4.95
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00 ..... 45&10%

Door—

Empire 50%
Bardsley's 45%

File and Tool—

Nicholson File Holders and File Handles ..... 33⅓&10%

Hooks—

Hooks, Bench, see *Stops, Bench.*

Cast Iron—

Bird Cage, Reading ..... 50&10%
Bird Cage, Sargent's List 60%
Ceiling, Sargent's List ..... 50&10%
Clothes Line, Reading List 50%
Clothes Line, Sargent's List. 50&20&10%
Coat and Hat, Sargent's List. 50@50&10%
Clothes Line, Stowell's 70%
Coat and Hat, Reading 50%
Coat and Hat, Stowell's 70%
Coat and Hat, Wrightsville 65%
Harness, Reading List ..... 50&10%
Harness, Stowell's 60%
School House, Stowell's 70%

Wire—

Belt ..... *80¢10%*
Wire C. & H. Hooks ..... *70@70¢10¢25%*
Atlas, Coat and Hat:
Single Cases 70%
10 Case Lots ..... 70&10%
Columbian Hdw Co. Gem ..... 60&10%
Parker Wire Goods Co.: King ..... 70&10%

Wire Goods Co:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—
Box, 6 in., per doz. $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@1.25
Wrought Staples, Hooks, &c.—
See *Wrought Goods.*

Miscellaneous—
Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50
Grass.....Nos. 1 2 3 4
Best..... $1.50 1.75 2.00
Common.. $1.30 1.30 1.40 1.60
Potato and Manure .....60@15%
Wh fletree.....lb. 5¾@6c
Hooks and Eyes:
Brass.....60@10c10@70%
Malleable Iron.....70@5@70@10%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $5.25 net
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*

Horseshoes—
See *Shoes, Horse.*

Hose Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 4½@ 5 c
3-ply Standard .....ft. 6½@ 7 c
4-ply Standard.....ft. 7½@ 8 c
5-ply extra.....ft. 8½@ 9 c
4-ply extra .....ft. 10 @10½c
Cotton Garden, ¾-in., coupled:
Low Grade .....ft. 6 @7 c
Fair quality.....ft. 8 @9 c

Irons— Sad—
From 4 to 10.....lb. 2¾@3 c
B. B. Sad Irons.....lb. 3¼@3½c
Chinese Laundry.....lb. 4¼@5c
Chinese Sad.....lb. 4@4½c
Mrs. Potts', per set:

Nos.....	*50*	*55*	*60*	*65*
JapdTops	*71*	*68*	*81*	*78*
TinaTops	*74*	*71*	*84*	*81*

New England Pressing, lb.. 3¾@4c

Pinking—
Pinking Irons.....doz. 50@60c

Soldering—
Soldering Coppers 2½ and 3..19@20c
1½ and 2.....21@22c

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&5%
Steel.....45&2½
Covert's Saddlery Works':
Daisy.....60&10%
Victor.....60&10%
Lockport.....50%
Lane's Steel.....30&10%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%
Hay and Straw—See *Hay Knives.*

Corn—
Withington Acme; ₱ doz., $2.65; Dent, $2.75; Ad). Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....70&5@70@10%
Bradley's.....35%
C. E. Jennings & Co. Nos. 45, 46..60&10%
Jennings & Griffin. Nos. 51, 52.60&10&10%
Swan's.....70&10&2½%
Watrous.....16⅔&10%
L. & I. J. White.....20&5@25%

Hay and Straw—
Lightning.....₱ doz. $6.50@7.00
Iwan's Sickle Edge.....₱ doz. $10.00
Iwan's Serrated.....₱ doz. $10.00
Maine.....₱ doz. $8.50

Mincing—
Buffalo.....₱ gro. $13.00

Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wosseinholm's.....₱ doz. $3.00@3.25

Knobs—
Base, 2¼-inch, Birch, or Maple, Rubber tip, gro.....$1 10@1.15
Carriage, Jap, all sizes..gro. .40@45c
Door, Mineral.....doz. 65@70c
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel....doz. $2.05@2.15
Bardsley's Wood Door, Shutter, &c. ..15%
Picture, Sargent's.....60&10&10%

Lacing Leather—
See *Belting Leather—*

Ladders, Step, Etc.—
Lane's Store.....25%
Myers Noiseless Store Ladders.....50%

Ladies— Melting—
L. & G. Mfg. Co, Low List.....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....45&10%

Lanterns— Tubular—
Regular Tubular No. 0. doz. $4.35@4.75
Lift Tubular..No. 0. .doz. $4.75@5.25
Hinge Tubular, No. 0 .doz. $4.75@5.25
Other Styles.....40@10@40@10@5%

Bull's Eye Police—
No. 1. 2¾ inch.....$2.50@2.75
No. 2, 3 inch.....$2.75@3.00

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron 50%

Latches—
Thumb—
Roggin's Latches, with screw. dz 35@40c

Leaders, Cattle—
Small.....doz. 55c; large, 60c
Covert Mfg. Co.....45&2%

Lifters, Transom—
R & E.....33⅓%

Lines—
Wire Clothes, Nos... 18 19 20
100 feet.....$2.20 2.00 1.65
75 feet.....$1.80 1.70 1.30
Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3.....10%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gr.....30%
Anniston Waterproof Clothes, 50 lt., ₱ gro.: $26.00; Gilt Edge, $24.00; Air Line $24.00; Acme, $19.00; Alabama, $17.00; Empire, $18.00; Advance, $15.00; Oriole, $22.00; Albermarle, $15.00; Eclipse, $13.50; Chicago, $12.50; Standard, $11.00; Columbia, $9.50.

Locks— Cabinet—
Cabinet Locks.....33⅓@33⅓&c7½%

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading Hardware Co.....50%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron.....75c&10c&5@30c&5%
R. & E. Mfg. Co. Wrt. Steel and Brass... 75@75&10%

Sash, &c.—
Ives' Patent.:
Bronze and Brass.....62½%
Crescent.....50%
Iron.....62½%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Reading.....net 50%

Machines— Boring—
Com., Upright, Without Augers..$2.00
Com., Angular, Without Augers..$2.25
Without Augers.

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3.	$4.25	No. 1 $5.00
Improved No. 4.	3.75	No. 2 3.38
Improved No. 5.	2.75	
Jennings'.. No. 4,	3.15	No. 1, 3.50
Millers' Falls.....		5.75
Snell's, Rice's Pat.	2.50	2.75

Corking—
Reisinger Invincible Hand Power..... ₱ doz. $48.00

Fence—
Williams' Fence Machines.....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake. 20%

Ice Cutting—
Chandler's.....15&10%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1; Boss Rotary	$57.00
Boss No. 7; Dietz Rotary	$60.00
Champion Rotary; Banner No. 1.	$54.00
Standard Champion No. 1.	$48.00
Standard Perfection	$36.00
Cinti Square Western	$30.00
Uneeda American, Round	$29.00

Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners', Hickory and Applewood, doz.....50@55c

Mats— Door—
Elastic Steel (W. G. Co.).....10%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk*

Mills— Coffee, etc.—
Enterprise Mfg. Co.....25@30%
National, list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Sun. No. 108, 1 ₱ mill.....₱ doz $3.00
Swift, Lane Bros Co.....30%

Mowers, Lawn—
Net prices are generally quoted.
Cheap.....all sizes, $1.90@1.95
Good.....all sizes, $2.25@2.50

	10	*12*	*14*	*16-inch*
High Grade	*4.25*	*4.50*	*4.75*	*5.00*

Continental.....60&5%
Great American.....70%
Great American Ball Bearing, new list. 70%
Quaker City.....70%
Pennsylvania.....60&5%
Penn-sylvania, Jr., Ball Bearing.....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K. T.....70&5%
Style A, all Steel.....65&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, low list...40&5%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899..85c&10@85c&10c&10%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
A. C.	25	23	22	21	21	40&5%
Ausable.	28	26	25	24	23	.50&10%
C. B. K.	25	25	22	21	21	40%
Champ'in	28	26	25	24	23	50%
Clinton	19	17	16	15	14	.30&10&5%
Maud S.	25	23	22	21	21	50%
Putnam	23	21	20	19	18	33⅓%
New "	19	18	17	16	16	10&10%

American, Nos. 5 to 10, ₱ lb. 9@9½c
Jobbers' special brands, per lb. 8@8½c

Picture—

	1½	*2*	*2½*	*3*	*3½ in.*
Brass Head.	*.45*	*.60*	*.70*	*.95*	*1.00 gro.*
Por. Head...	*..*	*1.10*	*1.10*	*1.10*	*.. gro.*

Nippers, See *Pliers and Nippers.*

Nuts—
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain.....$5.10
Hexagon, plain.....$5.60
Square, C. T. & R.....$5.30
Hexagon, C. T. & R.....$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank.....$6 00
Hexagon Blank.....$6.50
Square Tapped.....$6 00
Hexagon Tapped.....$6 50

Oakum—
Best or Government.....lb. 6¼c
Navy.....lb. 4½c
U. S. Navy.....lb. 5¼c
Plumbers' Spun Oakum.....2¾c
In carload lots ¼c lb. off f. o. b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....50c&10%
Tin or Steel .. ..70c&10@75%
Zinc .....65c&10%
Chase or Paragon:
Brass and Copper.....45c&10@50%
Tin or Steel.....75@75c&10%
Zinc.....65%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₱ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers etc.....60@60&10%

Openers— Can—
French.....doz. 35c
Iron Handle.....doz. 25@27c
Sprague, Iron Hdle..per doz. 35@40c
Sardine Scissors..doz. $1.75@$3.00
Marvel.....per doz. $1.25
National.....50%
Stowell's Sprague .....per doz. 35@45¢
Tip Top.....per doz. $0.75
Triumph Shear .....₱ gro. $9.00

Egg—
Nickel Plate.....per doz., $2.00
Silver Plate.....per doz., $4.00

Packing—
Asbestos Packing, Wick and Rope, 11½@15c lb.

Rubber—
Sheet, C. I.....8@10c
Sheet, C. O. S.....9@13c
Sheet, C. B. S.....10@11c
Sheet, Pure Gum.....50@65c
Sheet, Red.....40@50c
Jenkins' Standard, ₱ lb 80c....25@25&5%

Miscellaneous—
American Packing.....7@10c lb.
Cotton Packing.....16@20c lb.
Italian Packing.....9@12½c lb.
Jute.....4@4½c lb.
Russia Packing.....8@11c lb.

Pails— Creamery
S. S. & Co., with gauges.. No 1 $6.25; No. 2, $6.50 ₱ doz.

Galvanized—
Price per doz.

Quart.....	*10*	*12*	*14*
Water, Regular	*1.50*	*1.75*	*2.00*
Water, Heavy....	*2.75*	*3.00*	*3.25*
Fire, Rd. Bottom.	*2.50*	*2.60*	*2.80*
Well.....	*2.25*	*2.50*	*2.75*

Pans— Dripping—
Standard List.....60c&10@60c&10c&5%

Fry—
Common Lipped:

No.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.85*	*1.00*	*1.10*	*1.30*	*1.50*

Roasting and Baking—
Regal, S. S. & Co., ₱ doz., Nos. 5, $4.50; 10 $5.25; 20, $5.75; 30, $6.25.
Savory, ₱ doz., net, Nos. 200, $9.00; 400, $15 00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper—
Asbestos: lb.
Building Felt.....2¾c
Mill Board, sheet, 40 x 40 inches 3¼c
Mill Board, roll, thicker than 1-16 inch.....3½c
Mill Board, roll, 1-16 in. thick and less.....2½c
Per roll
Rosin Sized Sheathing: 500 sq. ft.
Light wt..25 lbs. to roll..$0.50@0.45
Medium wt..30 lbs. to roll..$0.55@0.50
Heavy wt..40 lbs. to roll..$0.65@0.70
Black Water Proof Sheathing, 500 Sq. ft., 1 ply, 60c; 2 ply, 85c; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 2, 3 and 4¼ sq. ft. to lb., ton.....$41.00
Red Rope Roofing, 250 sq. feet per roll.....$1.75
NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.
1 ply (roll 200 sq. ft.), ton..$32.50@35.50
2 ply, roll 108 sq. ft.....55@60c
3 ply, roll 108 sq. ft.....78@80c
Slater's Felt (roll 500 sq. ft.).....75c
NOTE.—*Above prices often include delivery.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.00

Sand and Emery—
Flint Paper and Cloth...50c&10@60%
Garnet Paper and Cloth.....25%
Emery Paper and Cloth...50c&10@60%

Parers— Apple—
Advance.....₱ doz. $4.50
Baldwin.....₱ doz. $5.00
Bonanza Improved.....each $0.50
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
New Lightning.....₱ doz. $7.50
Reading 72.....₱ doz. $4.00
Reading 78.....₱ doz. $7.00
Turn Table '98.....₱ doz. $6.75
White Mountain.....₱ doz. $6.00

Potato—
Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $6 00

Picks and Mattocks—
List Feb. 23, 1899..60c&10@60c&10c&10%

Pinking Irons—
See *Irons, Pinking.*

Pins— Escutcheon—
Brass .....60@60c&10%
Iron, list Nov. 11, '85.....60@60c&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in.....60c&10
Extra Heavy, 2-6 in.....65%
Fittings 70%

Pipe, Merchant,
Steel or Iron, Carload Lots,

Merchant Pipe.	*f.o.b, Pittsburgh. Black.*	*Galvanized.*
⅛, ¼, ⅜ inch.....	*68%*	*58%*
½-inch.....	*70%*	*60%*
¾ to 6 inch.....	*75%*	*65%*
7 to 12 inch.....	*69%*	*59%*

Pipe, Sewer—
Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England.....67%
New York and New Jersey.....70%
Maryland, Delaware, East Penn.72%
West Penn and West Va.....75%
Virginia.....75%
Ohio, Michigan and Ky.....75%
Indiana.....77%
Carload lots are generally delivered.

Pipe, Stove—
Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints ...	$7.50	$8 50
6 in., per 100 joints....	8.00	9.00
7 in., per 100 joints....	9.00	10.00

Planes and Plane Irons—
Wood Planes—
Bench, First quality....40c&5@40c&10%
Bench, Second qual.....50c&5@50c&10%
Molding.....33½c&5@33½c&10%
Bailey's (Stanley R. & L. Co) 5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality.....50@50&10%
Molding.....33½@33½&10%
Toy and German.....40@40&10%
Gage Self Setting.....35%
Union.....60%

Iron Planes—
Bailey's (Stanley R. & L. Co).....25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....20&10@20&10&10%
Sargent's.....60@60&10%
Union.....60%

Plane Irons—
Wood Bench Plane Irons.....30c&5@30c&10%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Stanley R. & L. Co...20&10@20&10&10%
L. & L. J. White.....20&5@25%

Planters, Corn, Hand.
Kohler's Eclipse.....₱ doz. $8.50

Plates—
Felloe.....lb. 3¾@4c
Self-Sealing Pie Plates (S. S. & Co.), ₱ doz. $2.00.....50%

Pliers and Nippers—
Button Pliers.....75@75c&10%
Gas Burner, per doz., 5 in., $1.25@ $1.30; 6 in., $1.45@$1.50
Gas Pipe..7 8 10 12-in.
$2.00 $2.25 $3.00 $3.75
Acme Nippers.....50@50&5%
Bernard's:
Cutting Nippers.....33⅓%
Parallel, Pliers.....33⅓%
Paragon Pliers.....50%
Lodi Pliers.....50%
Elm City Fence Pliers.....33⅓%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Improved Button.....70&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers, and Tools 40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers, 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor .....40@40&10&10%
Pocket Levels.....30@30&10&10%
Level Glasses.....60@60&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70%
C. E. Jennings & Co.'s Iron .....25&10%
C. E. Jennings & Co.'s Iron, Adjustable. 33⅓&10%
Stanley R. & L. Co ...70&10@30&10&10%

Stanley's Duplex..... 20@20&10&10%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz. No. 1, $6.00; No. 2, $9.00; No. 3, $4.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1 lb. papers.....lb. 6¼c
½-lb. papers.....lb. 6½c
¼-lb. papers.....lb. 6¾c

Pokes, Animal—

Ft. Madison Hawkeye.....₱ doz. $3.25
Ft. Madison Western.....₱ doz. $4.00

Police Goods—

Manufacturers' Lists.....25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.72.....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ ℔ boxes, ₱ doz. $1.25; 1 ℔ boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ½ pt. cans, ₱ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 ℔ cans.. ₱ ℔ 10¢
Black Eagle, Liquid, ½ pt. cans ₱ doz. 75¢
Black Jack Paste, ¾ ℔ cans, ₱ gro. $9.00
Black Kid Paste, 5 ℔ can.....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ ℔ 8¢
Fireside.....₱ gr. $2.50
Gem, ₱ gr. $4.50.....10%
Japanese.....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans..... ₱ doz. $1.50
Wynn's:
Black Silk, 5 ℔ pail.....each 70¢
Black Silk, ½ ℔ box.....₱ doz. $1.00
Black Silk, 5 oz. box.....₱ doz. $0.75
Black Silk, ½ pt. liq.....₱ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. 11.00
2 qt., Square.....gro. 13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6 ½ ft., 48¢.
Steel Hitching Posts, each.....$1.30

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb. each.....45c
Fine Sporting, 1 lb. each.....75c
Rifle, ½-lb. each.....15c
Rifle, 1-lb. each.....25c
King's Semi-Smokeless:
Keg (25 ℔ bulk).....$6.50
Half Keg (12½ ℔ bulk).....$3.50
Quarter Keg (6¼ ℔ bulk).....$1.90
Case 24 (1 ℔ cans bulk).....$8.50
Half case (1 ℔ cans bulk).....$4.50

King's Smokeless:	Shot Gun	Rifle
Keg (25 ℔ bulk)	$12 00	$15.00
Half Keg (12½ ℔ bulk)	6.25	7.75
Quarter Keg (6¼ ℔ bulk)	3.25	4.00
Case 24 (1 ℔ cans bulk)	14.00	17 00
Half case 12 (1 ℔ cans blk)	7.25	8 75

Robin Hood smokeless Shot Gun..50&20%

Presses—Fruit and Jelly—

Enterprise Mfg. Co.....30@25%
Sensible.....33⅓%
2 qt., $2.00; 4 qt., $4.00; 10 qt., $6.00 each.

Seal Presses—

Morrill's No. 1, per doz. $20.00.....50%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Cyclops.....50%
Dudly Improved Nail Puller.....50%
Miller's Falls, No. 3, per doz. $12.00..... 33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $30 00.....50%
Pelican, ₱ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2 B (large).....$5.50
No. 3 B (small).....$5.00
Smith & Hemenway Co.:
Ajax.....60%
Diamond B, No. 2, case lots, ₱ doz $4.00
Diamond B, No. 3, case lots, ₱ doz $5.50
Eureka.....50%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15.....40%
Yankee.....60&5%

Pulleys—Single Wheel—

Inch	2	2¼	3
Awning, doz	$0.55	.85	1.15

Hay Fork, Swivel or Solid Eye..... doz., 4 in., $1.15; 5 in., $1.40

Inch	2	2¼	2½
Hot House, doz	$0.70	.90	1.25
Inch	1¼	1½	1¾ 2
Screw.....doz	$0.16	.19	.23 .30
Inch	1¼	2	2¼ 2½
Side.....doz	$0.30	.40	.55 .63
Inch	1¼	1½	2 2¼
Tickle....doz	$0.50	.53	.58 1.00

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¼ and 2 in..16@19c
Auger Mortise, no Face Plate, per doz. 1¼ and 2 in.....16@19c
Auger Mortise, with Face Plate, per doz., 1¼ and 2 in.....16@19c
Acme.....1¼ in., 16¢; 2 in., 19¢
Common Sense, 1¼ in.... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz 50%
Grand Rapids All Steel Noiseless....50%
Ideal.....70&5%
Niagara.....1¼ in., 16¢; 2 in., 19¢
No. 26, Troy....1¼ in., 14½¢; 2 in., 16½¢
Star.....1¼ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....30@30&5%
Wood.....50@50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch..	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch..	3	3¼	3½	3¾ 4
	$3.30	3.60	3.85	4.10 4.40

Plunger Cup Leathers—Per 100:

Inch	2½	3	3½	4
	$2.75	3 85	5.00	6.00

Barnes Dbl. Acting (low list).... 50&10%
Contractors' Rubber Diaphragm No. 2 B. & L. Block Co.....$16.00
Daisy Spray Pump.....₱ doz. $7.20
Flint & Walling's Fast Mail (low list).55%
Flint & Walling's Pitcher Spout.....30%
National Specialty Mfg. Co., Measuring $8.00.....30%
Mechanical Sprayer.....$7.20
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Punches—

Saddlers' or Drive, good..doz. 65@70c
Spring, single tube, good quality... $1. 5@7.00
Revolving (4 tubes)...doz. $3.50@3.75
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Benard Spring Belt Punches.....33⅓%
Lodi Spring Belt Punches.....50%
Morrill's No. 1 (A.B.C.).₱ doz., $15.00 .50%
No. 2, ₱ doz. $22.50.....50%
Hercules, each $7 50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Paragon Spring Belt Punches.....50%
Steel Screw, B & K. Mfg. Co.....40%
Tinners' Hollow, P., S. & W. Co. 35@35&5%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44.....60%

Rail— Barn Door, &c.—

Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:

	⅛	⅝	¾ In.
	$1.70	$2.10	$3 00 100 feet.

Angular for Sq. Groove Wheels:

Small.	Med.	Large.	
$1.50	1.90	2.60	100 feet.

Sliding Door, Iron Painted..2½@3¼c
Sliding Door, Wrought Brass, 1¼ in.....lb. 36c..30%
Allith Mfg. Co., No. 1, Reliable Hanger Track, ₱ foot.....8¢
Allith Mfg. Co., No. 2, Reliable Hanger Track, ₱ foot.....10¢
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....3½¢
Lane's Hinged Track, ₱ 100 ft., 1 in., $3.70; 1¼ in., $4.40
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.00; 1¼ inch, $3.70; 1½ inch, $4.00.
Lanes' Standard, 1¼ in., ₱ 100 ft 4.00
Lawrence Bros., ₱ ft. 11¢.....60%
Lawrence Bros. New York.....3½¢
McKinney's Hinged Hanger Rail ₱ foot, 11¢.....50%
McKinney's None Better.....₱ ft. 3½¢
McKinney's Standard.....₱ ft. 4 ¢
Myers' Stayon Track.....50&10%
Smith's Wrought Brackets, Plain.....3½¢
Smith's Special.....4½¢
Smith's Never Jump, per ft. 11¢.....50%
Smith's Plain Steel.....30%
Smith's Milled Steel.....4½¢
Stowell's Cast Rail.....₱ ft. 1½¢
Stowell's Steel Rail, Plain.....25%
Stowell's Wrought Bracket, 1 3-16 in.... ₱ ft. 8¢
Stowell's Wrought Bracket, 1¼x3-16.... ₱ ft. 7¢
Swett's Hylo, per ft. 11¢.....50&10%
Swett's P. L. B. Steel Rail, ₱ 100 ft. $3.00

Rakes—

Net Prices, Malleable Rakes:

	10	12	14	16-tooth
Shank	$1.50	1.60	1.75	1.85
Socket	$1.65	1.80	1.95	2.10

Steel, Garden and Gravel, Aug. 1, '99 List.....70%
Weldless Steel.....75&5%
Malleable Iron, Garden.....70&10%
Lawn Rakes, Metal Head, per doz., 20 teeth.....$2.25@2.50
24 teeth.....$2.50@3.75
Fort Madison Red Head Lawn.....$3 25
Fort Madison Blue Head Lawn.....$3.00
Jackson Lawn, 20 and 30 teeth, ₱ doz., net, $4.25
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3.45
Lawn Queen, 24-tooth, ₱ doz $3.60
Paragon, 20 tooth, ₱ doz.....$2.75
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$2.98
Malleable Garden, 14-tooth, ₱ doz..$3.00

Rasps, Horse—

Disston's.....75¢
Heller Bros.....70&5@70&10@5%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....70&10@75%
See also *Files.*

Razors—

Borastic.....60 & 10%
Fox Razors, No. 42, ₱ doz. $20.00
Fox Razors, No. 44, ₱ doz. $20.00
Fox Razors, No. 52, Platina, ₱ doz. $25.00 } 40%
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 00.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

Safety Razors—

Safety Razors.....40%
New Gem, in Tin Boxes.....₱ doz. $12 00
New Gem, Extra Blades.....₱ doz. $8.35
Gem Outfits (Razor, Strop, etc.) ₱ doz. $5.60
Complete Razor, extra Blade in Leather Case.....₱ doz. $27.00
Silberseein.....40%

Reels— Fishing—

Bishop's Independent Fish Reel Spooler, ₱ doz.....$30.00
Hendryx:
M 6, Q 6, A 6, B 6, M 9½, M 14, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo.....20%
Aluminum, German Silver, Bronze. 25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*

Black Jap, White Jap, Bronzed, Nickel Plated, Electro Plated } 70&10@75 & 10%

Registers, Cash—

Sun, No. 10, Metal Cabinet.....$30.00
Sun, No. 10, Wood Cabinet.....$25.00

Revolvers—

Single Action.....85@90c
Double Act'n, except 44 cal.....$1.90
Double Action, 44 caliber.....$2.05
Automatic.....$3.60
Hammerless.....$4.10
Note.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in., per doz.....$2.25@$2.50
17 in., per doz.....$2.50@$2.75
18 in., per doz.....$2.75@$3 00

Rings and Ringers—

Bull Rings—

	2	2½	3 Inch
Steel	$0.70	0.75	0.80 doz
Copper	1.00	1.15	1.40 doz.

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $4.25@4.50
Hill's Ringers, Gray Iron, doz. 50@55c
Hill's Ringers, Mal. Iron, doz. 70@75c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $5.25@5.50
Brown's Ringers...per doz. $0.65@ .70

Rivets and Burrs—

Copper.....60@60c&5%
Iron or Steel:
Tinners'.....75c&10@75c&10c&5%
Miscellaneous.....70c&10@75%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....66⅔&5%
Cronk's Brinkerhoff.....66⅔&5%
Lane's Stay.....33⅓&5%
Stowell's Barn Door Stay.....₱ doz. $1.00

Rope—

Manila, 7-16 in. diam. and larger, tarred or untarred.....lb. .. @11½c
Manila, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. .. @11¼c
Sisal, 7-16 in. diam. and larger:
Mixed.....lb. .. @ 8¼c
Pure.....lb. .. @ 9¼c
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb. .. @ 8¼c
Pure.....lb. .. @ 9¼c
Sisal, Tarred, Medium Lath Yarn:
Mixed.....lb. .. @ 7¾c
Pure.....lb. .. @ 8¼c
Cotton Rope:.....Lb.
Best.....¼-in. and larger.. 14@15c
Medium..¼-in. and larger.. 13@14c
Com.....¼-in. and larger.. 9@10c
Jute Rope:
Thread No. 1, ¼-in. and up, lb. 6¼c
Thread No. 2, ¼-in. and up, lb. 6 c
Old Colony Manila Transmission Rope, ₱ ℔ 17½¢

Wire Rope—

Galvanized.....40&5%
Plain.....45&5%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....40&5%
Sisal.....30%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60&10@60&10c&5%
Ivory.....35&10@35&10c&5%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35&35&10&10%
Miscellaneous.....50@50&10&10%
Combination.....55&55&10%
Stationers'.....10@10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60&10%
Stanley R. & L. Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Upson Nut Co.:
Boxwood.....60@60&10%
Ivory.....35&10@35&10&10%

Sash Locks—See *Locks, Sash*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers, Sausage.*

Saw Frames—See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw.....40%
Wood Saws.....40%
Hand, Compass, &c.....40%
Chapin-Stephens Co.:
Turning Saws and Frames....30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&5%
Disston's:
Circular, Solid and Inserted Tooth..50%
Band, 3 to 14 in. wide.....60%
Band, ¼ to 2½.....70%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35%
Woodsaw Blades.....35%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 10, d100, D8, 120, 77, 77, 8.....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Keyhole, &c.....25%
Butcher Saws and Blades.....35%
C. E. Jennings & Co.'s.:
Back Saws.....25&10%
Butcher Saws.....30 &10%
Compass and Key Hole Saws.35&5&10%
Framed Wood Saws.....30&10%
Hand Saws.....20&2½&10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws.....30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....30@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....45%
Compass, Keyhole, &c.....25@25&7½%
Wood Saws.....35@35&7½%
Wheeler, Madden & Clemson Mfg. Co.'s
Cross Cut Saws.....50%

Hack Saws—

Atkins' Hack Saw Blades A A A.... 25%
Disston:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Fitchburg File Works, The Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.... 35&5&10%
Hack Saws, Nos. 175, 180, complete. 35&5&10%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames.....35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....35%
Sterling Hack Saw Frames.....30& 0&5%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $30.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scalers, Fish—

Bishop's Lightning.....₱ doz. $2.00
Covert's Saddlery Works.....60&10%

Scales—

Family, Turnbull's.....50@50&10%
Counter:
Hatch, Platform, ½ oz to 8 lbs. doz. $5.50
Two Platforms, ½ oz to 8 lbs. doz. $16
Union Platform, Plain...$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Chicago Scale Co.:
The "Little Detective," 25 lbs.....50%
Union or Family No. 2.....60%
Portable Platform (reduced list).....50%
Wagon or Stock (reduced list).....25@35%
Pelouze Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables.....50%
"The Standard" R. R. and Wagon.....50%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.60@2.85
Ship Light, $2.00; Heavy, $1.50
Adjustable Box Scraper (S. R. & L. Co) $6.00.....30@30&10%
Chapin-Stephens Co., Box.....30@30&10%

Screens, Window, and Frames—

Flyer Pattern Screens...60&5@60&5&2½%
Maine Screen Frames.....40&10&5%
Perfection Screens.....60&5@60&5&2½%
Phillips' Screen Frames..60&5@60&5&2½%
Porter's:
Fairview Screens.....60&5@60&5&2½%
Hummer Screens.....60&5@60&5&2½%
Klondike Screens.....60&5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand—

Bench, Iron..doz. 1 in., $2.50@2.75; 1¼, $3.60@3.25; 1½, $3.50@3.75
Bench, Wood, Beech....doz. 30@30&5
Hand, Wood.....30@30&5%
R. Bliss Mfg. Co, Hand.....30%
Chapin-Stephens Co., Hand.....30@30&10%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1, 99.....80&5%
Coach and Lag, Gimlet Point, list Oct. 1, '99.....80%
Hand Rail, list Jan. 1, '81.60&10@....%

Jack Screws—

Standard List.....75&10@30&5%
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50@50&5%
Sargent.....70%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.50@50&10%
Flat or Round Head, Brass50@50&10%

Set and Cap—

Set (Iron or Steel).....70&10&5%
Sq. Hd. Cap.......65&10&5%*
Hex. Hd. Cap.....65&10&5%
Rd. or Fillister Hd. Cap.....60%

Wood—

List July 23, 1903.
Manufacturers' printed discounts:
Flat Head, Iron.....87½&10@....%
Round Head, Iron.....85&10@....%
Flat Head, Brass.....85&10@....%
Round Head, Brass.....80&10@....%
Flat Head, Bronze....77½&10@....%
Round Head, Bronze.....75&10@....%
Drive Screws.....87½&10%

Scroll Saws—See *Saws, Scroll.*

Scythes—

Per doz.
Clipper Pattern, Grass...$4.25@$5.00
Full Polished Clipper.....$4.75@$5.50
Grain.....$7.00@$7.50
Clipper, Grain.....$7.75@$8.25
Weed and Bush.....$4.50@$5.00

Seeders— Raisin—

Enterprise.....25@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets:
Wood Hdle., 10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools doz. $2.50@3.00
Aiken's Sets, Awl and Tools:
No. 20, ₩ doz. $10.00.....50&10&10%
Fray's Adj. Tool H'dle.....Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....30&10%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18.... 15&10%
Stanley's Excelsior:
No. 1, $7.50; No 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison, Three Pieces, Hoe, Rake and Shovel.....₩ doz. sets.....$9.00

Nail—

Square.....per gro. $2.25@2.50
Round, Blk. and Pol., assorted.....gro. $1.80@2.00
Octagon.....gro. $4.50@5.75
Buck Brothers.....27½%
Cannon's Diamond Point, ₩ gr. $12..25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

Rivet—

Regular list.....70&10@75%

Saw—

Aiken's:
Genuine.....50&10%
Imitation.....50&10%
Atkin's:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....40%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 9½, $15.63.....50%
No. 1 Old Style, $10.00.....50%
Special, $16.25.....50%
Giant Royal, Cross Cut .....₩ doz. $8.50
Royal, Hand.....₩ doz. $5.0
Taintor Positive.....₩ doz $6 75

Shaving—

Fox Shaving Sets, No. 30, per doz, $24.00 net

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....63%

Shaves Spoke—

Iron.....doz. $1.00@1.15
Wood.....doz. $1.75@2.00
Bailey's (Stanley R. & L. Co.).....30@30&10&10%
Chapin-Stephens Co .....30@30&10&10%
Goodell's, ₩ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

Cast Iron...	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good	*$13.00*	*15.00*	*17 00 gro.*
Cheap	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality, Jap.....70@70&10%
" *Nickel.....60@60&10%*
Fair qual. Jap.....80@30&5%
" *Nickel.....75@75&10%*
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailors' Shears.....20%
Wilkinson's Hedge.....1900 list 45%
Wilkinson's Branch, Lawn and Border.....40%
Wilkinson's Sheep.....1900 list. 50%

Tinners' Snips—

Steel Blades.....20&5@20&10
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin.....40@40&10%
Heinisch's Snips.....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 inch.....40&7½&10%
Niagara Snips.....40%
P., S & W. Co.....20%
Triumph Pipe Shear.....₩ doz. 9.50

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₩ doz. $18.00.....25%
Disston's Pruning Hook, ₩ doz. $12.00.....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades...40@40&5%
Orange Shears.....50&10@50&20%
Grape.....40&10@50%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction.....50%
Patent Roller Hatfield's, Sargent's list, 70&10%
Reading.....50%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....50%

Sliding Shutter—

Reading list.....50%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells— Shells, Empty—

Brass Shells, Empty:
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge, 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic 10, 12, 16 and 20 gauge..5&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival, 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....20&10%
Robin Hood, High Brass.....30&10%

Shells, Loaded—

Loaded with Black Powder.....40%
Loaded with Smokeless Powder, medium grade.....50&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes Horse, Mule, &c.—

F. o. b., Pittsburg:
Iron.....per keg $3.85
Steel.....per keg 3.60
Burden's, all sizes, ₩ keg.....$3.90

Shot—

Drop, up to B, 25-lb. bag.....$1.60
Drop, B and larger, per 25-lb. bag $1.85
Buck, 25-lb. bag.....$1.85
Chilled, 25-lb. bag.....$1.85

Shovels and Spades—

Association List, Nov. 15, 1902....40%

Sieves and Sifters—

Hunter's Imitation, gro. $10.50@11.00

Buffalo Metallic Blued S. S. Co., ₩ gr.:		
14&16	16&18	18&20
$13.20	$13.50	$14.40

National Mfg. Co.:
Victor.....per gro. $12.00
Surprise.....per gro. $11.00
No Name.....per gro. $11 00
Shaker (Barler's Pat.) Flour Sifters, ₩ doz., $2.00.....30%

Sieves, Tin Rim—

Per dozen.

Mesh.....	*14*	*16*	*18*	*20*
Black, full size...	*$1.20*	*1.25*	*1.30*	*1.35*
Plated, full size.	*$1.30*	*1.35*	*1.40*	*1.45*
Black, scant.....		*$6.95*	*1.00*	*1.05*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.90@0 95
Mesh 20, Nested, doz.....1.00@1.05
Mesh 24, Nested, doz.....1.30@1.40

Sinks—

Cast Iron—

Standard list.....60@60&10%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Skeins, Wagon—

Cast Iron.....70@70&10%
Steel.....40@40&10%

Slates, School—

Factory Shipments.
"D" Slates.....40&10%
Noiseless Slates.....60&5 tens

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—

Sterling No. 10, $2.00.....33⅓

Snaps, Harness—

German.....40@40&10%
Covert Mfg. Co.:
Derby.....30&5&2%
High Grade.....45%
Jockey.....30&10%
Trojan.....45%
Yankee.....30&5&2%
Yankee, Roller.....30&5&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
Oneida Community Solid Swivel.....60%
Sargent's Patent Guarded.....60%&10%

Snaths—

Scythe.....45%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality.....50&10@60&5%
Cheap.....60@60&10%
International Silver Co.
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 17 Silver Plated Ware.....60&10%

Miscellaneous—

German Silver.....60@60&5%
Cattaraugus Cutlery Co.:
Yukon Silver.....50%
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 10&10%

Tinned Iron—

Teas.....per gro. 45@50c
Tables.....per gro. 90c@$1.00

Springs— Door—

Chicago (Coil).....40&10%
Gem (Coil).....20%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 39 in.....₩ doz. $1.10
Victor (Coil).....50&10&10%

Carriage, Wagon, &c.

1¼ in. and Wider:
Black or ¼ Bright, lb.....4¾@5 c
Bright, lb.....5¼@5½c
Painted Seat Springs:
1½ x 2 x 26, per pr.....50@55c
1½ x 2 x 28 per pr.....60@65c
1½ x 3 x 28 and narrower, per pr. 80@85c

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ₩ doz. $12; No. 2, $15; No. 3, $24.....30%

Squares—

Nickel plated.... } *List Jan. 5, 1900.*
Steel and Iron... } 70&10@70&10&10%
Rosewood Hdl Try Square and T-Bevels.....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels, 40&10@40&10&10%
Disston's Try Sq. and T-Bevels.....70%
Winterbottom's Try and Miter.....40&10@40&10&10%

Squeezers— Lemon—

Wood, Common, gro., No. 0, $5.25 @$5.50: No. 1, $6.25@$6.50.
Wood, Porcelain Lined, Cheap.....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined.....doz. $1.75

Staples—

Barbed Blind.....lb. 6@6½c
Electricians', Association list.....80&10&10&10%
Fence Staples, Plain $2.25; Galvanized.....$2.55
Poultry Netting, Staples....per lb. 3¼@3½c
Grand Crossing Tack Co.'s list....80&10%

Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
C. & A. Hoffmann's.....40%

Steelyards.....30@30&10%

Stocks and Dies—

Blacksmiths'.....40&10@50%
Curtis Reversible Ratchet Die Stock.25%
Derby Screw Plates.....25%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%

Stone—

Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $3.00 per gro., 12 inch, $10.80
Norton Emery Scythe Stones:
Less than gross lots.....₩ gro. $9.00
One gross or more.....₩ gro. $7.20
Lots of 10 gross or more....₩ gro $6.00
Pike Mfg. Co. 1901 list:
Black Diamond S. S....₩ gro. $12.00
Lamoille S.....₩ gro. $11.00
White Mountain S. S....₩ gro. $9.00
Green Mountain S. S....₩ gro. $6.00
Extra Indian Pond S. S.₩ gro. $7.50
No. 1 Indian Pond S. S..₩ gro. $7.00
No. 2 Indian Pond S. S..₩ gro. $4.50
Leader Red End S. S....₩ gro $4.50
Balance of 1901 list 33⅓%

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list:

	₩ lb.
Arkansas Stone, No. 1, 3 to 5½ in.	$2.80
Arkansas Stone, No. 1, 5½ to 8 in.	$3.50
Arkansas Slips No. 1.....	$4.00
Lily White Washita 4 to 8 i	60¢
Rosy Red Washita, 4 to 8 in	60¢
Washita Stone, Extra, 4 to 8 in..	50¢
Washita Stone, No. 1, 4 to 8 in..	40¢
Washita Stone, No. 2, 4 to 8 in..	30¢
Lily White Slips.....	90¢
Rosy Red Slips.....	90¢
Washita Slips, Extra.....	80¢
Washita Slips, No. 1.....	70¢

33⅓%
India Oil Stones (entire list).....33⅓%
Hindostan No. 1, Regular....₩ lb 8¢
Hindostan No. 1 Small.....₩ lb 10¢
Axe Stones (all kinds).....40%
Turkey Oil Stones, ex. 5 to 8 in. ₩ lb 80¢
Queer Creek Stones, 4 to 8 in.....30¢
Queer Creek Slips.....40¢
Sand Stone.....5¢
Belgian, German and Swaty Razor Hones.....50%
Natural Grit Carving Knife Hones, ₩ doz.....$3.00
Quick Edge Pocket Knife Hones, ₩ doz.....$2.00
Mounted Kitchen Sand Stone, ₩ doz.....$1.50

Stoners— Cherry—

Enterprise.....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...₩ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%
Whipple's Combination.....₩ doz. $2 50

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 55@60c
Socket.....doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, per doz. $6.....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, 1902.....30&5%

Sweepers, Carpet—

National Sweeper Co.:	Per doz.
Loyal, Roller Bearing, Fancy Veneers	$25.00
Marion, Roller Bearing, regular finishes, full Nickel	$24.00
Marion Queen, Roller Bearing, full Nickel	$24.00
Monarch, Roller Bearing, Nickel	$22.00
Monarch, Roller Bearing, Jap'ned.	$20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel	$3 .00
Monarch Extra, Roller Bearing, (17-inch case), Nickel	$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned	$33.00
National Queen, Fancy Veneers..	$27.00
Perpetual, Regular Bearings, Nkl.	$20.00
Perpetual, Regular Bearings, Jap.	$18.00

NOTE.—*Discount of 30c per dozen on three-dozen lots. Discount of $1 per dozen on five-dozen lots.*

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks, American.....90&25&5@....%
American Cut Tacks..90&20&5@....%
Swedes Iron Tacks...90&30&5@....%
Swedes Upholsterers' Tacks.....90&15&10&5@....%
Gimp Tacks.....90&15&5@....%
Lace Tacks.....90&40@....%
Trimmers' Tacks..90&30&10&5@....%
Looking Glass Tacks....70&10@....%
Bill Posters' and Railroad Tack....90&15&5@....%
Hungarian Nails...80&20&5@....%
Common and Patent Brads.....80&10%
Trunk and Clout Nails...80&5@....%

NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks...90 and 6 tens
Steel Wire Brads, R. & E. Mfg. Co's list.. 50&10@60%

See also *Nails, Wire.*

Tanks, Oil—

	Each.
Emerald, S. S. & Co.....30-gal	$3.25
Emerald, S. S. & Co.....60-gal.,	$4.00
Queen City S. S. & Co., 30-gal.	$3.65
Queen City S. S. & Co., 60-gal.	$4.50

Tapes, Measuring—

American Asses' Skin.....40&10@50%
Patent Leather.....25@30&5%
Steel.....40@40&10%
Chesterman's.....25@25&5%
Eddy Asses' Skin.....40&10@5%
Eddy Patent Leather.....25@30&5%
Eddy Steel.....40@40&10%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝ inch and larger, per 100 lbs...$3.00

Thermometers—

Tin Case.....80&10@80&10&10%

Ties, Bale—Steel Wire.

Single Loop.....80&10%
Monitor, Cross Head, Etc.....70%

Brick Ties—

Niagara Brick Ties.....20&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tools—
L. & J. White ..... 30@20&5%

Coopers'—
Hay—
Myers' Hay Tools 50%
Stowell's Hay Carriers 5%
Stowell's Hay Forks 50%
Stowell's Fork Pulleys 50%

Saw—
Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—
L. & J. White 25%

Transom Lifters—
See *Lifters, Transom.*

Traps— Fly—
Balloon, Globe or Acme ..... doz. $1.15@1.25 ; gro. $11.50@12.00
Harper, Champion or Paragon ..... doz. $1.25@1.50 ; gro. $15.00@13 50

Game—
Oneida Pattern ..... 80@80@5%
Newhouse ..... 45@45&5%
Rawley & Norton ..... 65@65&5%
Victor (Oneida Pattern) ..... 75@75&5%
Jump (Blake Pattern) 60@5@60&10%

Mouse and Rat—
Mouse, Wood, Choker, doz. holes ..... 8½@9c
Mouse, Round or Square Wire ..... doz. 85@90c
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1.12½ ; ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 7 $2.75 doz.
No. 5, Mouse ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00
No. 2, ₱ gr. $20.00; Mouse, No. 3, $18.00 ..... 50%
J. M. Mast Mfg. Co.: Per gro.

	Mouse.	Rat.
Blizzard	No. 12, $3.00	No. 1, $9 80
Old Nick	No. 30, 2.22	No. 2, 8.40
Joker	No. 5, 2.10	No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 2 hole, $2 40.
Imp'd Snap Shot, Mouse, per gro., 4 hole, $4.20.

Trimmers Spoke—
Bonney's Nos. 1 and 2 ..... 33⅓%
Wood's No. 1 ..... 50%

Trowels—
Boston Brick and Pointing 30%
Boston Plastering 25%
Boston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 3 in. ..... ₱ gro. $5.00
Kohler's Steel Garden Trowels, 6 in ..... ₱ gro. $6.00
Never-Break Steel Garden Trowels ..... gro. $6.00
Rose Brick and Plastering ..... 25&5%
Woodrough & McParlin, Plastering .. 25%

Trucks, Warehouse, &c.—
A. & L. Block Co.:
New York Pattern ..... 50&10%
Western Pattern ..... 60&10%
Handy Trucks ..... per doz. $16.00
Grocery ..... per doz. $15.00
Easy Stove Trucks, Improved pattern ₱ doz. $18.50
Model Stove Trucks ..... ₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	$5.00	5.50	6.25

Galvanized Wash Tubs (S. S. & Co.):

	No. 1	2	3	10	20	30
Per doz., net	$5.70	6.50	7.20	6.30	7.20	8.10

Twine—Miscellaneous—

Wax Twine—	BC.	B.
No. 9, ¼ and ½-lb. Balls	.20c@22c	
No. 12, ¼ and ½ lb. balls	.16c@18c	
No. 18, ¼ and ½-lb. Balls	.14c@16c	
No. 24, ¼ and ½-lb. Balls	.14c@16c	
No. 36, ¼ and ½-lb. Balls	.13c@15c	

Chalk Line, Cotton, ½-lb Balls 25c
Cotton Mops, 6, 9. 12 and 15 lb. to doz ..... 9½@10c
Cotton Wrapping 5 Balls to lb according to quality ..... 11c@22c
American 2-Ply Hemp, ¼ and ½-lb. Balls ..... 13@14c
American 3 Ply Hemp, 1-lb. Balls . 13@14c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 9c
India 3-Ply Hemp, 1-lb. Balls 9c
India 3-Ply Hemp, 1½-lb. Balls .. 8c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls... 9@10c
Mason Line, Linen, ½-lb. Balls ..46c
No. 264 Mattress, ¼ and ½-lb Balls 37c
Wool, 3 to 6 ply ..... 5½@6c

Vises—

Solid Box ..... 50c&10@60%

Parallel—
Athol Machine Co :
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Bonney's 33⅓%
Columbian Hdw. Co 40%
Emmert Universal:
Pattern Makers' No. 1 ..... $15.00
Pattern Makers' No. 2 ..... $12.50
Machinist and Tool Makers' No. 4, $12.50
Fisher & Norris Double Screw .... 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewi Too' Co ..... 20@30%
Morrill's 20%
Miller's Falls ..... 60&10%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists 40%
Jewelers 33⅓%
Snediker's X, L 33⅓%
Stephens' 33⅓%

Saw Filers'—
Bonney's, No. 1, $13; No. 3, $16 .... 40%
Disston's D 3 Clamp and Guido, ₱ doz $30 ..... 25%
Perfection Saw Clamps, ₱ doz. $8 00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

Wood Workers'—
Wyman & Gordon's Quick Action, 6 in., $6.00 ; 9 in., $7.00 ; 14 in., $8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe Vise 60%
Hollands' Combination Pipe .... 60@60&5%
Parker's Combination Pipe:
87 Series 60%
187 Series ..... 60&5%
No. 870 ..... 40%

Wads—Price Per M.

B. E., 11 up	60c
B. E., 9 and 10	70c
B. E., 8	80c
B. E., 7	80c
P. E., 11 up	$1.00
P. E., 9 and 10	1.25
P. E., 8	1.50
P. E., 7	1.50
Ely's B. E., 11 and larger	$1.70@1.75
Ely's P. E., 12 to 20	$3.00@3.25

Dis. 15%

Ware Hollow—
Cast Iron, Hollow—
Stove Hollow Ware:
Enameled ..... 55c&10@60%
Ground ..... 60c&10@65%
Plain or Unground ..... 65c&10@70%
Country Holloware per 100 lbs., $2.50
White Enameled Ware:
Maslin Kettles 70%
Covered Ware:
Tinned and Turned 40%
Enameled 50%
See also *Pots Glue.*

Enameled—
Agate Nickel Steel Ware .... 50&20
Agate Nickel Steel Ware, Specials .... 60&15%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled 50%

Tea Kettles—
Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45c	50c	55c	65c

Steel Hollow Ware.
Avery Spiders & Griddles .... 65@65&5%
Avery Kettles 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles ..... 65&5%
Never Break Kettles 60%
Solid Steel Spiders & Griddles .... 65&5%
Solid Steel Kettles 60%

Warmers, Foot—
Pike Mfg. Co., Soapstone .... 40@40&10%

Washboards—
Solid Zinc: ₱ doz
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.65
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface:
Naiad, family size, open back perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

Washers—
Leather, Axle—
Solid ..... 80c@10@80c@10c@10%
Patent ..... 90@90c@5%
Coil: ⅞ 1 1¼ 1¾ Inch.
11c 12c 13c 14c per box

Iron or Steel—
Size bolt .... 5-16 ⅜ ½ ⅝ ¾
Washers $5.10 4.20 2.90 2.70 2.50
In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—
Over ½ inch, barrel lots. per lb. ..... 1¾@2c

Waterers, Hog—
Improved Dewey, ₱ doz $13.00

Wedges—
Oil Finish ..... lb. 2.60@2.70c

Weights—

Hitching—
Covert's Saddlery Works ..... 60&10%

Sash—
Per ton, f.o.b. factory:
Eastern District $26.00
Western, Central and Southern Districts market unsettled, prices ranging from $21.00@25.00

Wheels, Well—
8-in., $1.60@1.80; 10-in., $2.00@2.25; 12-in., $2.45@2.65; 14-in., $3.00@4.25

Wire and Wire Goods—
Bright and Annealed:
6 to 9 ..... 72½&5@72½&10
10 to 18 ..... 72½&10@72½&10&5%
19 to 26 ..... 75&10@72½&10@75&10@71½%
27 to 36 ..... 75&10@75&10@80@72½%
Galvanized:
6 to 18 ..... 70@70&5%
19 to 26 ..... 72½&5@72½&10%
27 to 36 ..... 72½&10@72½&10&5%
Coppered:
6 to 9 ..... 70&5@70&10%
10 to 18 ..... 70&10@70&10&5%
19 to 26 ..... 75&72½@75&10@72½%
27 to 36 ..... 75&10@75&10&5%
Tinned:
6 to 14 ..... 75@75&72½%
15 to 18 ..... 72½&5@75%
19 to 26 ..... 70&5@70&5&5%
27 to 36 ..... 70@70&5%
Tinned and Annealed on Spools ..... 70@70&10%
Brass & Copper on Spools 80@60&10%
Brass, list Feb. 26, '96 ..... 30%
Copper, list Feb. 26, '96 ..... 15%
Cast Steel Wire 50%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
List June 24, 1903 ..... 90@90&10%

Wire Cloth and Netting—
Galvanized Wire Netting ..... 80&10@80&10&5%
Painted Screen Cloth, per 100 ft. $1.25
Standard Galv. Hardware Grade:
Nos. 2, 2½ and 3 Mesh, sq. ft. 3c
Nos. 4 and 5 Mesh, sq. ft. 3½c
No. 6 Mesh, sq ft 3½c
No. 8 Mesh, sq ft 4c

Wire Barb—See *Trade Report.*

Wrenches—
Agricultural ..... 80@80&10%
Baxter Pat'n S Wrenches ..... 70&5@70&10%
Drop Forged S ..... 55@55&5%
Acme ..... 60&10%
Alligator 70%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S ..... 35&5%
Adjustable S Pipe 40%
Brigg's Pattern ..... 30&10%
Combination Black ..... 40&5%
Combination Bright 40%
Merrick's Pattern 50%
No. 3 Pipe, Bright 55%
Boardman's 33⅓%
Coes' Genuine Knife Hdl .... 40&10&5&5%
Coes' Genuine Steel Hdl .... 40&10&5&5%
Coes' Genuine Key Model .... 40&10&5&5%
Coes' "Mechanics' ..... 40&10&10&5&5%
Donohue's Engineer ..... 40&10%
Dudly Combination ..... 50&10&5%
Dudly Pipe ..... 50&10&5%
Dudly Adjustable Pipe ..... 40&10&5%
Eagle ..... 50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws 33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots ..... 50&5%
Less than case lots 50%
Improved Pipe (W. & B.) 40%
Solid Handles, P.S. & W ..... 50@50&5%
Stillson 65%
Triumph ..... 60&10%
Vulcan Chain 50%

Fruit Jar—
T & B Fruit Jar Wrenches ..... ₱ gro $9.00
Triumph Fruit Can Wrenches, ₱ gro $9.60
Triumph Fruit Jar Holders .. ₱ gro. $15.00

Wrought Goods—
Staples, Hooks, &c., list March 17 '92 ..... 90@90&5%

Yokes Neck—
Covert Saddlery Works, Trimmed 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters' .. list net

Zinc—
Sheet ..... lb 6@6¼c

PAINTS, OILS AND COLORS.

White Lead, Zinc, &c.
Red, English white, in Oil .. 8½@ 9¼
Red American White in Oil:
Lots of 500 ℔ or over ..... @ 6¼
Lots less than 500 ℔ ..... @ 7
In Barrels ..... @ 6
Red, White, in oil, 25 ℔ tin pails, add ½ keg price ..... @ ¼
Red, White, in oil, 12½ ℔ tin pails, add to keg price ..... @ 1
Red, White, in oil, 1 to 5 ℔ assorted tins, add to keg price .. @ 1½
Red, American, Terms: For lots 12 tons and over ½¢ rebate ; and 2% for cash paid in 15 days from date of invoice ; for lots of 500 lbs. and over 2% for cash paid in 15 days from date of invoice; for lots of less than 500 lbs. net.
Red White, Dry in bbls ..... @ 6
Red, American, dry ..... ₱ ℔ 4½@ 4¾
Red, Paris, Red Seal, dry ..... @ 8½
Red, Paris, Green Seal, dry ..... @ 9½
Red, Antwerp Red Seal, dry ..... @ 6¾
Red, Antwerp, Green seal, dry .. @ 8½
Red, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over ..... 12 @12¼
Lots of less than 1 ton ..... 12¼@12½
Red, V. M. French, in Poppy Oil, Red Seal:
Lots of 1 ton and over ..... 10¾@11¼
Lots of less than 1 ton ..... 11@11½
DISCOUNTS.—V. M. French Zinc.—Dealers, buyers of 10 bbl. lots or one or more grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors.
Black, Carbon ..... ₱ ℔ 5 @10
Black, Drop, Amer ..... 4 @ 6
Black, Drop, Eng ..... 5 @15
Black, Ivory ..... 16 @20
Blue, Com ..... 4½@ 6
Blue, Celestial ..... ₱ ℔ 4 @ 6
Blue, Chinese ..... 29 @32
Blue, Prussian ..... 27 @30
Blue, Ultramarine ..... 4½@15
Brown, Spanish ..... ½@ 1
Brown, No. 40 ..... ₱ ℔ $3.50@3.75
Brown, Chrome, ordinary ..... 3½@ 6
Green, Chrome, pure ..... 17 @25
Lead, Red, bbls ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6½
Lots less than 500 ℔ ..... @ 7
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6½
Lots less than 500 ℔ ..... @ 7
Ocher, American ..... ₱ ton $8.50@16.00
Ocher American Golden ..... 2½@ 3
Ocher French ..... 1½@ 2½
Ocher Foreign Golden ..... 2 @ 4
Orange Mineral, English .. ₱ ℔ 9 @11
Orange Mineral, French ..... 10½@11½
Orange Mineral, German ..... 8½@ 9
Orange Mineral, Amer'can .... 7½@ 8
Red, Indian, English ..... 4½@ 8½
Red, Indian, American ..... 3 @ 3½
Red, Turkey, English ..... 4 @ 6
Red, Tuscan, English ..... 7 @10
Red, Venetian, Amer., ₱ 100 ℔. 50@1.50
Red Venetian, English, ₱ 100 ℔. 1.25@1 75
Sienna, Italian, Burnt and Powdered ..... ₱ ℔ 3 @ 6½
Sienna, Ital., Raw, Powd ..... 3 @ 6½
Sienna, American, Raw ..... 1½@ 2
Sienna, American, Burnt and Powdered ..... ₱ ℔ 1½@ 2
Talc, French ..... ₱ ℔ 1½@ 2½
Talc, American ..... 75 @1.25
Terra Alba, French, ₱ 100 ℔ . 95 @1.00
Terra Alba, English ..... 95 @1.00
Terra Alba, American No. 1 .... 85 @85
Terra Alba, American No. 2 .... 45 @50
Umber, Turkey Bnt. & Pow. ₱ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer ..... 1½@ 2
Umber, Raw, Amer ..... 1½@ 2
Yellow, Chrome ..... 11 @14
Vermilion, American Lead .... 10 @25
Vermilion, Quicksilver, bulk .. @70
Vermilion, Quicksilver, bags .... @71
Vermilion, English, Import .. 80 @85
Vermilion, Chinese .. @0.90@1.00

Colors in Oil.
Black, Lampblack ..... 12 @14
Blue, Chinese ..... 36 @46
Blue, Prussian ..... 32 @36
Blue, Ultramarine ..... 13 @16
Brown, Vandyke ..... 11 @14
Green, Chrome ..... 10 @15
Green, Paris ..... @24
Sienna, Raw ..... 12 @15
Sienna, Burnt ..... 12 @15
Umber, Raw ..... 11 @14
Umber, Burnt ..... 11 @14

Miscellaneous.
Barytes, White Foreign, ₱ ton $17.50@20.00
Barytes Amer. floated ..... 18.50@20.00
Barytes, Crude, No. 1 ..... 10.00@11.00
Chalk, in bulk ..... ₱ ton 3.15@ ....
Chalk, in bbls ..... ₱ 100 ℔ .... @ 35
China Clay, English ..... ₱ ton 11.00@17.00
Cobalt, Oxide ..... ₱ 100 ℔ 2.50@ ...
Whiting, Common ..... ₱ 100 ℔ .45@ .48
Whiting, Gliders ..... .55@ .57
Whiting, extra Gliders' .... .58@ .60

Putty.
In bladders ..... 1¾@2¼
In bulk ..... 1½@2
In cans 1 ℔ to 5 ℔ ..... 2½@4¼
In cans 12 ½℔ to 25 ℔ ..... 1½@2¾

Spirits Turpentine.
In Oil bbls ..... 67½@68
In machine bbls ..... 68 @68½

Glue.
Cabinet ..... ₱ ℔ 11 @15
Common Bone ..... 6 @ 8
Extra White ..... 18 @24
Foot Stock, White ..... 11 @14
Foot Stock, Brown ..... 7 @10
German Hides ..... 12 @18
French ..... 10 @16
Irish ..... 13 @16
Low Grade ..... 8 @11
Medium White ..... 14 @17

Gum Shellac— Cts. per lb.
Bleached ..... 43 @55
Button ..... 45 @56
Diamond I ..... 68 @..
Fine Orange ..... 56 @57
A. C. Garnet ..... 45 @46
D. C ..... 70 @..
T. N ..... 48 @51
V. S. O ..... 68 @..

Animal, Fish and Vegetable Oils.
Linseed, City raw ..... ₱ gal. 40 @41
Linseed, City, boiled ..... 42 @43
Linseed, State and West'n, raw 38 @39
Linseed, raw Calcutta seed ..... @65
Lard, Prime, Winter ..... 60 @61
Lard, Extra No. 1 ..... 50 @52
Lard, No. 2 ..... 38 @39
Cotton-seed, Crude, f.o.b mills. 29 @30
Cotton-seed, Summer Yellow, prime ..... 37 @37½
Cotton-seed Summer Yellow, off grades ..... 36½@37
Sperm, Crude ..... @55
Sperm, Natural Spring ..... 61 @62
Sperm, Bleached Spring ..... 63 @66
Sperm, Natural Winter ..... 65 @66
Sperm, Bleached Winter ..... 67 @68
Tallow, Prime ..... 48 @49
Whale, Crude ..... @..
Whale, Natural Winter ..... 46 @47
Whale Bleached Winter ..... 48 @49
Menhaden, Brown, Strained .... 31 @32
Menhaden, Light Strained ..... 32 @33
Menhaden, Bleached Winter .... 34 @35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon ..... 6 @ 6¼
Cocoanut, Cochin ..... 6½@ 6¾
Cod, Domestic ..... 39 @40
Cod, Newfoundland ..... 40 @41
Red Elaine ..... 44 @45
Red Saponified ..... ₱ ℔ 5½@ 5¾
Olive, Italian, bbls ..... 48½@ 53
Neatsfoot prime ..... 54 @ ..
Palm, prime, Lagos ..... ₱ ℔ 6½@6¾

Mineral Oils.
Black, 20 gravity, 25@30 cold test ..... ₱ gal. 13 @14
Black, 30 gravity, 15 cold test. 14 @15
Black, Summer ..... 13 @14
Cylinder, light filtered ..... 20½@21½
Cylinder, dark filtered ..... 18½@19½
Paraffine, 903-907 gravity ..... 15 @15½
Paraffine, 903 gravity ..... 14 @14½
Paraffine, 885 gravity ..... 11¾@12½
Paraffine, red ..... 14 @15½
In small lots ½¢ advance.

CURRENT METAL PRICES.

JANUARY 27, 1904.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:	
1 to 1⅞ in. round and square, ₩ lb	@1.80¢
1½ to 4 in. x ⅜ to 1 in., ₩ lb	@2.00¢
1½ to 4 in. x ¼ to 5-16, ₩ lb	@2.00¢
Rods—⅜ and 11-16 round and square, ₩ lb	@2.00¢
Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.15¢
3 in. x 3-16 in. and ⅜ in.	2.40¢
1¼ to 2½ in. x ⅛ in.	2.05¢
1¼ to 2½ in. x 3-16 in. and thicker	2.00¢
1 to 1¼ in. x 3-16 in.	2.05¢
1 to 1¼ x ⅛ in.	2.10¢
⅞ x ¼ in.	2.25¢
⅝ x ¼ in.	2.35¢
⅝ x ⅛ in.	3.15¢
½ x 3-32 in.	3.65¢
Tees:	
1 in.	2.55¢
1¼ in.	2.35¢
1½ to 2½ in.	2.25¢
3 in. and larger	2.40¢
Beams	2.35¢
Channels, 3 in. and larger	2.35¢
Bands—1½ to 6 x 3-16 to No. 8, ₩ lb	2.30¢
"Burden's Best" Iron, base price, ₩ lb	3.05¢
Burden's "H. B. & S. Iron, base price, ₩ lb	2.85¢
"Ulster," ₩ lb	3.10¢
Norway Bars	3.25@3.75¢
Norway Shapes	3.75@4.25¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.85¢
Toe Calk, Tire and Sleigh Shoe	2.00@2.50¢
Best Cast Steel, base price in small lots	7¢

Soft Steel Sheets—

¼ inch	2.30¢	No. 14	2.45¢
3-16 inch	2.30¢	No. 16	2.55¢
No. 8	2.30¢	No. 18	2.65¢
No. 10	2.35¢	No. 20	2.65¢
No. 12	2.40¢	No. 22	2.70¢

Sheet Iron from Store.

Black.

	One Pass, C. R. Soft Steel	R. G. Cleaned.
No 14	₩ lb 2.45	2.60¢
No. 16	₩ lb 2.55	2.70¢
Nos. 18 to 21	₩ lb 2.65	2.80¢
Nos. 22 to 24	₩ lb 2.70	2.90¢
Nos. 25 and 26	₩ lb 2.75	3.00¢
No. 27	₩ lb 2.80	3.10¢
No. 28	₩ lb 2.90	3.20¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb	11¼@14¢
Patent Planished, ₩ lb A, 10¢; B, 9¢, net.	

Galvanized.

Nos. 14 to 16, ₩ lb,	2.93¢
Nos. 18 to 20, ₩ lb,	3.17¢
Nos. 22 to 24, ₩ lb,	3.41¢
No. 26, ₩ lb,	3.66¢
No. 27, ₩ lb,	3.90¢
No. 28, ₩ lb,	4.15¢
No 30, ₩ lb,	5.12¢

No. 20 and lighter, 36 inches wide, 25¢ higher.

Foreign Steel from Store—

Best Cast, ₩ lb	15¢
Extra Cast, ₩ lb	18@20¢
Swaged, Cast, ₩ lb	16¢
Best Double Shear, ₩ lb	15¢
Blister, 1st quality, ₩ lb	13¢
German Steel, Best, ₩ lb	10¢
2d quality, ₩ lb	9¢
3d quality, ₩ lb	8¢
Sheet Cast Steel, 1st quality, ₩ lb	15¢
2d quality, ₩ lb	14¢
3d quality, ₩ lb	12¢
R. Mushet's "Special," ₩ lb	46¢
" " "Titanic," ₩ lb	19¢
Hobson's Choice XX Extra Best, ₩ lb	35¢
Jessop Self Hardening, ₩ lb	45¢
Seamans' "Nelson" Steel	40¢
Hobson's "Soho" Special Self-Hardening, ₩ lb	43¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.

	Per lb
Banca, Pigs	29½@29¾¢
Straits, Pigs	29½@29¾¢
Straits in Bars	30 @30¼¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	$7.50
IX, 14 x 20	8.00
Melyn Grade:	
IC, 14 x 20	6.25
IX, 14 x 20	7.50
Allaway Grade:	
IC, 14 x 20	5.25
IX, 14 x 20	6.35

American Coke Plates—Bessemer—

IC, 14 x 20 .....108 lb	$4.40@4.45
IX, 14 x 20	$5.40@5.50

American Terne Plates—

IC, 20 x 28	$8.60
IX, 20 x 28	$10.60

Copper—

Duty: Pig, Bar and Ingot and Old Copper free. Manufactured, 2½¢ ₩ lb.

Ingot—

Lake	13¾@13¾¢
Casting	13¼@13⅝¢

Sheet and Bolt—

October 22, 1903. Net

Prices, in cents per pound.

Sheet 30 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, 50 lb. sheet, 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lb.	24 oz. to 32 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 12½ lb.	12 oz. and 13 oz. 9½ to 11 lb.	10 oz. and 11 oz. 7¾ to 9½ lb.	8 oz. and 9 oz. 6¼ to 7¾ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	18	19	19	19	20	21	22	25	28
30	96	72	18	19	19	19	20	22	25	28	
30	.....	96	18	19	19	19	21	25			
36	72	.....	18	19	19	19	21	26	29		
36	96	72	18	19	19	19	21	28			
36	120	96	18	19	19	20	22				
36	.....	120	18	19	18	21					
48	72	.....	18	19	18	21	23	26	29		
48	96	72	18	19	18	22	24	27			
48	120	96	18	19	21	23	27				
48	.....	120	18	20	22	25					
60	72	.....	19	19	20	22	25	30			
60	96	72	18	19	21	23	26				
60	120	96	18	20	22	25					
60	.....	120	18	21	23	27					
72	96	.....	18	22	22	27					
72	120	96	18	21	24	29					
72	.....	120	19	22	27						
108	96	.....	19	22	25						
108	120	96	20	23	26						
108	.....	120	21	24	28						
wider than 108	132	.....	22	25							
	.....	132	23	24							

Circles, Segments and Pattern Sheets, 3¢ ₩ lb advance over price of sheet Copper required to cut them from.

Cold or Hard Rolled Copper. 14 oz. ₩ square foot and heavier, 1¢ ₩ lb over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ lb over the foregoing prices.

All Polished Copper, 20 in. wide and under. 1¢ ₩ lb advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 in. wide, 2¢ ₩ lb advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₩ lb more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ lb	23¢
12 oz. and up to 14 oz. to square foot, ₩ lb	24¢
10 oz. and up to 12 oz., ₩ lb	26¢
Lighter than 10 oz., ₩ lb	29¢

Circles less than 8 in. diameter, 2¢ ₩ lb additional

Circles over 13 in. diameter are not classed as Copper Bottoms.

Polished Copper Bottoms and Flats, 1¢ ₩ lb extra.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.

Last Feb. 20, 1901.

Nos.	0000 to 8 Base	9 and 10		11 and 12
		½¢		½¢ ₩ lb adv.
Nos.	13	14	15	16
	¾¢	¾¢	1¢	1½¢ ₩ lb adv.
Nos.	17	18	19	20
	1¼¢	2¢	2½¢	3½¢ ₩ lb adv.

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.

Nov. 2, 1903. Net. Outside Diameter.

Stubs' W. G.	B. & S. W. G.	⅛	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-21	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	28
22	10	.....	.....	.....	.....	.....	.....	24	24	23	23	18	18
23	11	.....	.....	.....	.....	.....	.....	25	25	23	23	18	18
24	12	.....	.....	.....	.....	25	25	25	23	23	23	19	19
25	13	.....	.....	.....	26	25	25	25	23	23	23	19	19
26	14	.....	.....	26	26	25	25	25	23	23	23	20	20
27	15	.....	29	26	26	25	25	25	23	23	23	21	21
28	16	49	31	27	27	26	26	26	24	24	24	22	22
29	17	58	31	27	27	26	26	26	24	24	24	23	23
30	18-19	60	31	27	27	26	26	26	24	24	24	24	24
31	20	62	47	29	28	28	26	25	25	25	25	25	25
32	21	67	52	31	31	29	29	27	26	26	26	26	26
33	22	72	57	33	33	31	31	29	29	29	29	29	29
34	23	77	62	49	44	42	41	41	39	37	36	36	37
35	24	82	67	52	47	45	43	42	42	40	40	41	42

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
36	32	30	27	27	21	21	21	21	21	21	21	23	23	25	27	28¢ ₩ lb

Copper, Bronze or Gilding Tubes, 3¢ ₩ lb additional

Brazed Brass Tubing.

(*To No. 19, inclusive.*) June 6, 1898.

Brown & Sharpe's gauge standard.

	Per lb.
Plain Round Tube, ¼ in. up to 2 in.	$0.35
" " " ⅜ "	.36
" " " ½ "	.38
" " " ⅝ "	.41
" " 5-16 " ⅝ "	.48
" " ¼ " 5-16"	.65
" " 3-16 " ¼"	1.00
" " ⅛ " 3-16"	1.50
Smaller than ¼ inch	Special
2 inch to 3 in. in. to No. 19, inclusive	.38
3 inch	.40
Over 3 inch to 3¼ inch, inclusive	.45
Over 3¼ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.

Discount from list 25%

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass Wider than and including	in. 2 12	in. 12 14	in. 14 16	in. 16 18	in. 18 20	in. 20 22	in. 22 24	in. 24 26
To No. 20 inclusive	.22	.23	.25	.27	.29	.31	.33	.36
Nos. 21 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38
Nos. 27 and 28	.23	.25	.28	.30	.32	.34	.36	.39

Common High Brass Wider than and including	in. 26 28	in. 28 30	in. 30 32	in. 32 34	in. 34 36	in. 36 38	in. 38 40
To No. 20, inclusive	.39	.42	.46	.50	.55	.60	.65 *
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75

* Special prices not less than 80 cents.

Add ½¢ ₩ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 25%

Wire in Coils.

List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gilding bronze and copper
All Nos. to No. 10, inclusive	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.52	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.82
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.25
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 25%; Copper Wire, Net. List November 16, 96.

Spring Wire. 2¢ ₩ lb advance.

Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₩ lb, net	18¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₩ lb net,	19¢

Other sizes and extreme lengths, special prices.

Spelter—

Duty: In Blocks or Pigs, 1¢ ₩ lb

Western Spelter	5¾@6 ¢

Zinc.

Duty: Sheet, 2¢ ₩ lb.

No. 9, base, casks	5½@6¾¢
Open, per lb	7@7¼¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb

American Pig	5@5¼¢
Bar	5¾@6¢
Pipe	₩ lb 4½@6¢
Tin Lined Pipe	₩ lb 12¢
Block Tin Pipe	₩ lb 40¢
Sheet Lead	₩ lb 5¾@6¢

Old Lead in exchange, 4¢ ₩ lb

Solder.

½ & ½, guaranteed	19 @19½¢
No. 1	17 @17½¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₩ lb.

Cookson	₩ lb 7½@7¾¢
Hallett's	₩ lb 6¾@7 ¢

Aluminum—

Duty: Crude, 8¢ ₩ lb. Plates, Sheets, Bars and Rods, 13¢ ₩ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:

Small lots	₩ lb 37¢
100-lb lots	₩ lb 35¢

No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:

Small lots	₩ lb 34¢
100-lb lots	₩ lb 33¢

Aluminum Sheet, B. & S. gauge. 50 lb or more	₩ lb.	₩ lb.	₩ lb
Wider than	6-in.	14-in.	24-in.
And including	14-in.	24-in.	30-in.
Nos. 13 to 19	$0.42	$0.44	$0.47
No. 20	.44	.46	.49
Nos. 21 to 23	.46	.48	.51
No. 24	.46	.50	.53
No. 25	.47	.51	.54
No. 26	.47	.54	.56
No. 27	.48	.57	.62
No. 28	.48	.57	.64
No. 29	.49	.60	.66
No. 30	.50	.64	.70

Note.—Lots of less than 50 lb 5¢ ₩ lb extra.

Aluminum Wire, B. & S. Gauge.			
Larger than No. 9	₩ lb 40¢	No. 15	₩ lb 43¢
No. 9 to No. 10	₩ lb 40½¢	No. 17	₩ lb 50¢
No. 11	₩ lb 41 ¢	No. 18	₩ lb 53¢
No. 12	₩ lb 41½¢	No. 19	₩ lb 60¢
No. 13	₩ lb 42 ¢	No. 20	₩ lb 65¢
No 14	₩ lb 42½¢	No. 21	₩ lb 85¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₩ lb 11
Light and Tinned Copper	₩ lb 10½¢
Heavy Brass	₩ lb 7½
Light Brass	₩ lb 5½
Lead	₩ lb 4
Tea Lead	₩ lb 3½
Zinc	₩ lb 4
No. 1 Pewter	₩ lb 17
No. 2 Pewter	₩ lb 15¢
Pure Aluminum, Sheet, ₩ lb	21
Cast Aluminum, ₩ lb	16
Tin Plate Scrap	₩ ton $4 50@5
Wrought Scrap Iron	₩ gross ton $11.50@12.00
Heavy Cast Scrap	₩ gross ton $10.50@11 00
Stove Plate Scrap	₩ gross ton $8.50@9.00
Burnt Iron	₩ gross ton $5.50@6.00